Iowa Ambient Air Monitoring
2011 Network Plan

Air Quality Bureau
Iowa Department of Natural Resources

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Introduction

States and other agencies delegated to perform air monitoring under the Clean Air Act are required to examine their networks annually to insure that they meet federal requirements (Appendix A). These requirements include the number and type of monitors operated and the frequency of sampling. Certain monitors in the network, known as State and Local Air Monitoring Stations (SLAMS) are required by federal regulations, and discontinuing a SLAMS monitor requires concurrence from EPA (Appendix B). Special purpose monitors (SPM's) provide important additional air quality information (such as background concentrations for permitting activities[1,2]) but changes to the SPM network do not require concurrence from EPA.

One of the requirements of the annual network plan is to provide specific information for monitors that produce data that may be compared with federal air standards. This information, along with information concerning various types of monitors operated in the Iowa air monitoring network, is contained in Appendix C and Appendix D.

Ozone Monitoring Network Analysis

EPA's population-based monitoring requirements for ozone are reproduced in Appendix E. These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix F) and the ozone levels monitored in or downwind of the MSA over the past three years (Appendix G). Based on this information, the minimum number of population-based SLAMS ozone monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	1
Des Moines-West Des Moines, IA	1
Davenport-Moline-Rock Island, IA-IL	1

In Iowa, there is one SLAMS monitor for the Omaha-Council Bluffs MSA, two SLAMS monitors for the Des Moines MSA, two SLAMS monitors for the Davenport-Moline-Rock Island MSA, one SLAMS monitor for the Cedar Rapids MSA, and one SLAMs monitor for the Waterloo-Cedar Falls MSA. The state of Iowa shares the responsibility for ozone monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). Currently (as of June 1, 2011), three SLAMS ozone monitors are operated in Omaha, Nebraska and one SLAMS ozone monitor is operated in Rock Island, Illinois.

In addition to population-based requirements, each State is required to operate one multi-pollutant NCORE site. Ozone monitoring is required at an NCore site. Iowa operates an ozone analyzer at its NCore site in Davenport to meet this requirement.

Iowa's ozone monitoring network meets the minimum federal requirements. The total number of ozone monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality

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[1] For examples of the way monitoring data is used to develop background concentrations for permitting activities, see the discussions of $PM_{2.5}$, NO_2 and SO_2 at: http://www.epa.gov/ttn/scram/guidance_clarificationmemos.htm .

[2] The federal statute that requires baseline ambient air quality data in an area before initiating construction of a new "major source" of air pollution is available here: http://www.law.cornell.edu/uscode/html/uscode42/usc_sec_42_00007475----000-.html .

mapping, compliance, and understanding ozone related atmospheric processes includes more sites than these minimum numbers. All Iowa ozone monitors are listed in Appendix D and displayed in Appendix K. There are no anticipated reductions to the SLAMS ozone monitoring network prior to the submission of the next network plan. Changes to the SPM network that are expected to occur before the submission of the next network plan are indicated in Appendix I.

$PM_{2.5}$ Monitoring Network Analysis

EPA's population-based monitoring requirements for $PM_{2.5}$ are contained in 40 CFR Part 58, Appendix D (reproduced in Appendix E). These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix F) and the $PM_{2.5}$ levels monitored in the MSA over the past three years (Appendix J). Based on this information, the minimum number of required population-based SLAMS $PM_{2.5}$ monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	1
Des Moines-West Des Moines, IA	1
Davenport-Moline-Rock Island, IA-IL	1
Cedar Rapids, IA	1
Waterloo-Cedar Falls, IA	1

Iowa operates two SLAMS $PM_{2.5}$ monitors (filter samplers) in Des Moines, two in Davenport, and one each in Cedar Rapids and Waterloo. Iowa shares the responsibility for $PM_{2.5}$ monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). In 2010, four SLAMS $PM_{2.5}$ monitoring sites (5 monitors) were operated by Nebraska in the Omaha-Council Bluffs MSA; and one SLAMS $PM_{2.5}$ monitor was operated by Illinois in the Davenport-Moline-Rock Island MSA (Appendix H).

In addition to population-based minimum requirements, 40 CFR Part 58 also specifies that each state operate at least one $PM_{2.5}$ monitor to measure background concentrations, and at least one site to measure regional transport of $PM_{2.5}$. A SLAMS background monitor is located at Emmetsburg in northwest Iowa, and SLAMS transport monitors are located at Lake Sugema in Southeast Iowa and Viking Lake in Southwest Iowa.

40 CFR Part 58 indicates that population-oriented monitoring sites near industrial sources produce data that may be compared to the 24-hour $PM_{2.5}$NAAQS, but not to the annual $PM_{2.5}$ NAAQS. The $PM_{2.5}$ monitoring sites near Blackhawk Foundry in Davenport, at Chancy Park in Clinton, and Musser Park in Muscatine, are adjacent to industrial sources and are not comparable to the annual $PM_{2.5}$ NAAQS.

In MSA's where a single $PM_{2.5}$ monitor is required, 40 CFR Part 58 requires that an additional continuous $PM_{2.5}$ monitor is operated at same monitoring location. A continuous $PM_{2.5}$ monitor for the Omaha-Council Bluffs MSA is operated by a Nebraska agency. Continuous $PM_{2.5}$ monitors are currently operated in Des Moines, Davenport, Cedar Rapids, and Waterloo.

40 CFR Part 58 specifies that the minimum frequency for manual $PM_{2.5}$ sampling at required SLAMS sites is one sample every three days. Required SLAMS sites with a 24-hour design value within 5% of the 24-hour $PM_{2.5}$ NAAQS (34 $\mu g/m^3$ to 36 $\mu g/m^3$) must assume a daily sampling schedule. All $PM_{2.5}$ samplers recording design values in this range are currently operating on a daily sampling schedule.

In addition to these $PM_{2.5}$ monitoring requirements, EPA requires that each State operate at least one multi-pollutant NCore site (Appendix M). Continuous and filter-based $PM_{2.5}$ monitors as well as $PM_{2.5}$ chemical speciation samplers are required at each NCore site. Iowa operates these three types of $PM_{2.5}$ samplers at its NCore site in Davenport to meet this requirement.

The $PM_{2.5}$ chemical speciation monitor operated at Iowa's NCore site is needed to meet federal requirements, the remaining four $PM_{2.5}$ chemical speciation monitors in the Iowa network are Special Purpose monitors.

Iowa's $PM_{2.5}$ monitoring network meets the minimum federal requirements. The total number of $PM_{2.5}$ monitoring sites needed to support the basic monitoring objectives of public data reporting, air quality mapping, compliance, and understanding $PM_{2.5}$-related atmospheric processes includes more sites than these minimum numbers. Iowa's complete $PM_{2.5}$ monitoring network is listed in Appendix D and displayed in Appendix K**.** There are no anticipated reductions to the SLAMS $PM_{2.5}$ monitoring network prior to the submission of the next network plan. The rational for the relocation of the SLAMS $PM_{2.5}$ FRM samplers in Cedar Rapids and Waterloo (pending EPA approval) is presented in Appendix I. Changes to monitors in the SPM $PM_{2.5}$ network that are expected to occur before the submission of the next network plan are detailed in Appendix I***.***

PM_{10} Monitoring Network Analysis

EPA's population-based monitoring requirements for PM_{10} are reproduced in Appendix E. These requirements apply to metropolitan statistical areas (MSA's) and depend on the population of the MSA (Appendix F) and PM_{10} levels in the MSA (Appendix L). Based on this information, the minimum numbers of population-based SLAMS PM_{10} monitors is indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	4-8
Des Moines-West Des Moines, IA	1-2
Davenport-Moline-Rock Island, IA-IL	1-2
Cedar Rapids, IA	0-1

Iowa operates two SLAMS PM_{10} monitors in the Des Moines-West Des Moines MSA, three in the Davenport-Moline-Rock Island MSA, and one in the Cedar Rapids MSA. Iowa shares the responsibility for PM_{10} monitoring in the Omaha-Council Bluffs MSA with Nebraska agencies, and in the Davenport-Moline-Rock Island MSA with Illinois agencies (Appendix H). In 2010, seven SLAMS PM_{10} sites were operated by Nebraska in the Omaha MSA; and no SLAMS PM_{10} monitors were operated by Illinois in the Davenport-Moline-Rock Island MSA.

In addition to population-oriented PM_{10} monitoring requirements, EPA requires that each State operate at least one multi-pollutant NCore site (Appendix M). PM_{10} samplers are required at each NCore site. Iowa operates a PM_{10} sampler at its NCore site in Davenport to meet this requirement.

Iowa's PM_{10} monitoring network meets the minimum federal requirements. Additional PM_{10} monitors are operated in order to support compliance activities and to compute background levels for air dispersion modeling. Iowa's complete PM_{10} monitoring network is listed in Appendix D and displayed in Appendix K**.** There are no anticipated reductions to the SLAMS PM_{10} monitoring network prior to the submission of the next network plan. The rational for the relocation of the SLAMS PM_{10} samplers in Cedar Rapids and Waterloo (pending EPA approval) is presented in Appendix I. Changes to monitors in the SPM PM_{10} network that are expected to occur before the submission of the next network plan are detailed in Appendix I.

Sulfur Dioxide Monitoring Network Analysis

Federal requirements for SO_2 monitoring are reproduced in Appendix O. EPA modified the SO_2 NAAQS and associated network design criteria on June 2, 2010. The rule requires operation of monitors in populated areas with high SO_2 emissions by January 1, 2013. To implement the monitoring requirements of the new rule, EPA developed the population weighted emissions index (PWEI) to determine if SO_2 monitoring is required in an MSA. The PWEI is calculated by multiplying the population of the MSA by the total SO_2 emissions in the MSA and dividing by 1,000,000. The PWEI for Iowa Metropolitan Statistical Areas is computed in Appendix S. Based on this information, the minimum numbers of SLAMS SO_2 monitors for Iowa MSA's where monitors are required are indicated below:

MSA	Number of Monitors Required
Omaha-Council Bluffs, NE-IA	1
Sioux City, IA-NE	1

In 2010, Nebraska operated two SLAMS SO_2 sites in the Omaha-Council Bluffs MSA and South Dakota operated two SLAMS SO_2 monitors in the Sioux City MSA. Greater than 99% of SO_2 emissions in the Sioux City MSA are from one utility (MidAmerican Energy's Neil Station) operating in the Iowa portion of the MSA. By January 1, 2013, Iowa intends to add a SLAMS SO_2 monitoring site on the Iowa side of the Sioux City MSA. Iowa has not yet established a specific location for the operation of this monitoring site, but details relevant to site selection are described in Appendix T.

In addition to the PWEI based monitoring requirements, sulfur dioxide is included in the suite of pollutants to be monitored at EPA National Core (NCore) monitoring sites. Iowa operates a sulfur dioxide analyzer at its NCore site in Davenport to meet this requirement.

Existing SO_2 monitors are listed in Appendix D and displayed in Appendix K. There are no planned reductions to the SLAMS monitoring network for sulfur dioxide scheduled before submission of the next network plan. Changes to SPM monitors in the SO_2 network that are anticipated before the submission of the next network plan are indicated in Appendix I.

Nitrogen Dioxide Monitoring Network Analysis

On January 22, 2010, the U.S. Environmental Protection Agency revised the nitrogen dioxide (NO_2) [3] NAAQS (reproduced in Appendix P). The rule will require one monitor in any MSA with a population of 1 million or more to measure community-wide concentrations. Iowa does not contain or share any MSA's with populations this large and no community-wide monitoring stations are required at this time.

NO_2 levels are expected to be highest near major roadways, and the NAAQS includes a requirement to install a microscale near-roadway monitor in each MSA with a population of 500,000 or more by January 2013. Iowa

[3] 75 FR 6474, February 9, 2010

will be required to operate one near roadway monitor in the Des Moines MSA, and shares the responsibility for monitoring in the Omaha MSA with Nebraska. The Nebraska network plan indicates that they will operate a monitor in Omaha for the Omaha MSA[4].

The rule requires an additional near-roadway monitor in MSA's with populations of 2,500,000 or greater as well as in MSA's that contain roadway segments with average daily traffic counts of 250,000 or more. Iowa does not contain or share any MSA's with populations this large, or road segments with traffic counts this high and additional near-roadway monitors are not required.

Iowa's NO_2 monitors are listed in Appendix D and displayed in Appendix K. Changes to SPM monitors in the NO_2 network that are anticipated before the submission of the next network plan are indicated in Appendix I.

Carbon Monoxide Monitoring Network Analysis

There are no federal population-based carbon monoxide monitoring requirements.

EPA requires that each State operate at least one multi-pollutant NCore site (Appendix M). Carbon monoxide monitoring is required at each NCore site. Iowa operates a Carbon Monoxide monitor at its NCore site in Davenport to meet this requirement.

Iowa's carbon monoxide monitors are listed in Appendix D and displayed in Appendix K. There are no planned reductions to the SLAMS monitoring network for carbon monoxide scheduled before submission of the next network plan. Changes to SPM monitors in the CO network that are anticipated before the submission of the next network plan are indicated in Appendix I.

Toxics Monitoring Network Analysis

Iowa currently operates three air toxics sites. There are no minimum requirements for the number of toxics sites contained in 40 CFR Part 58. Details concerning Iowa's air toxics network are contained in Appendix D and displayed in Appendix K. No modifications to the air toxics network are anticipated before the submission of the next network plan.

NCore Monitoring Network Analysis

Requirements for a multi-pollutant "NCore" site are contained in 40 CFR Part 58, and reproduced in Appendix M. The department operates an NCore site at Jefferson School in Davenport (AQS ID 191630015) to meet this requirement.

Lead Monitoring Network Analysis

EPA requires source-oriented SLAMS lead monitoring near industries that emit over 0.5 tons per year (tpy) of lead. The rule allows for a waiver of monitoring requirements if air dispersion modeling predicts ambient air

[4] Nebraska 2010Ambient Air Monitoring Network Plan and 5 Year Assessment

concentrations less than half the NAAQS. These waivers must be renewed every five years. Current federal lead monitoring rules are reproduced in Appendix N.

Two facilities exceeded the 0.5 tpy emissions estimates threshold in the proposed lead rule according to the department's latest (2009) emissions estimates. Griffin Pipe Products Corporation in Council Bluffs had lead emissions of 1.437 tpy, and Grain Processing Corporations (GPC) in Muscatine had emissions of 3.145 tpy. A list of Iowa facilities with the largest lead emissions is contained in Appendix Q.

Iowa currently operates a monitor near Griffin Pipe Products Corporation in Council Bluffs. This site was described in a supplement to the 2009 network plan and installed in November 2009.[5] The 2010 monitoring data from this site indicated non-attainment with the lead NAAQS.[6] The facility has recently installed new control equipment in order to lower lead emissions and ambient impacts. Dispersion modeling results incorporating the latest stack test data predict that the new controls will result in attainment of the NAAQS, see Appendix R.

EPA granted a five year waiver of lead monitoring requirements near GPC after review of Iowa's five year network plan.[7] Dispersion modeling that was the basis of the waiver showed that the maximum ambient impact near the facility was less than 5% of the lead NAAQS. Lead emissions from GPC have decreased according to the latest estimates, and no other changes at GPC have occurred that would affect lead emissions or dispersion characteristics, and the IDNR believes EPA's waiver of ambient monitoring requirements for this facility continues to be appropriate.

[5] See the document titled "Iowa Ambient Lead Monitor Siting - Griffin Pipe Products Co. Council Bluffs" at: 2009 Iowa Lead Site Plan (PDF).
[6] See page 41 of the "Iowa Ambient Air Monitoring Annual Report" for 2010 at: http://www.iowadnr.gov/air/prof/monitor/files/10ambient.pdf.
[7] See EPA's approval letter for the five year network plan Iowa submitted in September of 2010, at: http://www.epa.gov/region7/air/quality/pdf/air_qaulity_ia_five_year_network_assessment_approval_letter.pdf

Appendix A: 40 CFR Part 58 Requiring Annual Network Plans

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a)(1) Beginning July 1, 2007, the State, or where applicable local, agency shall adopt and submit to the Regional Administrator an annual monitoring network plan which shall provide for the establishment and maintenance of an air quality surveillance

system that consists of a network of SLAMS monitoring stations including FRM, FEM, and ARM monitors that are part of SLAMS, NCore stations, STN stations, State speciation stations, SPM stations, and/or, in serious, severe and extreme ozone nonattainment areas, PAMS stations, and SPM monitoring stations. The plan shall include a statement of purposes for each monitor and evidence that siting and operation of each monitor meets the requirements of appendices A, C, D, and E of this part, where applicable. The annual monitoring network plan must be made available for public inspection for at least 30 days prior to submission to EPA.

(2) Any annual monitoring network plan that proposes SLAMS network modifications including new monitoring sites is subject to the approval of the EPA Regional Administrator, who shall provide opportunity for public comment and shall approve or disapprove the plan and schedule within 120 days. If the State or local agency has already provided a public comment opportunity on its plan and has made no changes subsequent to that comment opportunity, and has submitted the received comments together with the plan, the Regional Administrator is not required to provide a separate opportunity for comment.

(3) The plan for establishing required NCore multipollutant stations shall be submitted to the Administrator not later than July 1, 2009. The plan shall provide for all required stations to be operational by January 1, 2011.

(4) A plan for establishing Pb monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator no later than July 1, 2009 as part of the annual network plan required in paragraph (a)(1) of this section. The plan shall provide for the required source-oriented Pb monitoring sites to be operational by January 1, 2010, and for all required non-source-oriented Pb monitoring sites to be operational by January 1, 2011. Specific site locations for the sites to be operational by January 1, 2011 are not required as part of the July 1, 2009 annual network plan, but shall be included in the annual network plan due to be submitted to the EPA Regional Administrator on July 1, 2010.

(5) A plan for establishing NO2 monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the Administrator by July 1, 2012. The plan shall provide for all required monitoring stations to be operational by January 1, 2013.

(b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The monitoring objective and spatial scale of representativeness for each monitor as defined in appendix D to this part.

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual PM2.5 NAAQS as described in § 58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either source-oriented or nonsource- oriented according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58.

(11) Any source-oriented or nonsource- oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM10 monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

(12) The identification of required NO2 monitors as either near-road or area-wide sites in accordance with appendix D, section 4.3 of this part.

(c) The annual monitoring network plan must document how States and local agencies provide for the review of changes to a PM2.5 monitoring network that impact the location of a violating PM2.5 monitor or the creation/change to a community monitoring zone, including a description of the proposed use of spatial averaging for purposes of making comparisons to the annual PM2.5 NAAQS as set forth in appendix N to part 50 of this chapter. The affected State or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.

(d) The State, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby States and Tribes or health effects studies. For PM2.5, the assessment also must identify needed changes to population-oriented sites. The State, or where applicable local, agency must submit a copy of this 5- year assessment, along with a revised annual network plan, to the Regional Administrator. The first assessment is due July 1, 2010.

(e) All proposed additions and discontinuations of SLAMS monitors in annual monitoring network plans and periodic network assessments are subject to approval according to § 58.14. [71 FR 61298, Oct. 17, 2006, as amended at 72 FR 32210, June 12, 2007; 73 FR 67059, Nov. 12, 2008; 73 FR 77517, Dec. 19, 2008; 75 FR 6534, Feb. 9, 2010]

EFFECTIVE DATE NOTE: At 75 FR 35601, June 22, 2010, § 58.10 was amended by adding paragraph (a)(6), effective Aug. 23, 2010. For the convenience of the user, the added text is set forth as follows:

§ 58.10 Annual monitoring network plan and periodic network assessment.

(a) * * *

(6) A plan for establishing SO2 monitoring sites in accordance with the requirements of appendix D to this part shall be submitted to the EPA Regional Administrator by July 1, 2011 as part of the annual network plan required in paragraph (a) (1). The plan shall provide for all required SO2 monitoring sites to be operational by January 1, 2013.

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Appendix B: SLAMS Network Modification

40 CFR Part 58, § 58.14 System modification.

(a) The State, or where appropriate local, agency shall develop and implement a plan and schedule to modify the ambient air quality monitoring network that complies with the findings of the network assessments required every 5 years by §58.10(e). The State or local agency shall consult with the EPA Regional Administrator during the development of the schedule to modify the monitoring program, and shall make the plan and schedule available to the public for 30 days prior to submission to the EPA Regional Administrator. The final plan and schedule with respect to the SLAMS network are subject to the approval of the EPA Regional Administrator. Plans containing modifications to NCore Stations or PAMS Stations shall be submitted to the Administrator. The Regional Administrator shall provide opportunity for public comment and shall approve or disapprove submitted plans and schedules within 120 days.

(b) Nothing in this section shall preclude the State, or where appropriate local, agency from making modifications to the SLAMS network for reasons other than those resulting from the periodic network assessments. These modifications must be reviewed and approved by the Regional Administrator. Each monitoring network may make or be required to make changes between the 5-year assessment periods, including for example, site relocations or the addition of PAMS networks in bumped-up ozone nonattainment areas. These modifications must address changes invoked by a new census and changes due to changing air quality levels. The State, or where appropriate local, agency shall provide written communication describing the network changes to the Regional Administrator for review and approval as these changes are identified.

(c) State, or where appropriate, local agency requests for SLAMS monitor station discontinuation, subject to the review of the Regional Administrator, will be approved if any of the following criteria are met and if the requirements of appendix D to this part, if any, continue to be met. Other requests for discontinuation may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of appendix D to this part, if any, continue to be met.

(1) Any $PM_{2.5}$, O_3, CO, PM_{10}, SO_2, Pb, or NO_2SLAMS monitor which has shown attainment during the previous five years, that has a probability of less than 10 percent of exceeding 80 percent of the applicable NAAQS during the next three years based on the levels, trends, and variability observed in the past, and which is not specifically required by an attainment plan or maintenance plan. In a nonattainment or maintenance area, if the most recent attainment or maintenance plan adopted by the State and approved by EPA contains a contingency measure to be triggered by an air quality concentration and the monitor to be discontinued is the only SLAMS monitor operating in the nonattainment or maintenance area, the monitor may not be discontinued.

(2) Any SLAMS monitor for CO, PM_{10}, SO_2, or NO_2which has consistently measured lower concentrations than another monitor for the same pollutant in the same county (or portion of a county within a distinct attainment area, nonattainment area, or maintenance area, as applicable) during the previous five years, and which is not specifically required by an attainment plan or maintenance plan, if control measures scheduled to be implemented or discontinued during the next five years would apply to the areas around both monitors and have similar effects on measured concentrations, such that the retained monitor would remain the higher reading of the two monitors being compared.

(3) For any pollutant, any SLAMS monitor in a county (or portion of a county within a distinct attainment, nonattainment, or maintenance area, as applicable) provided the monitor has not measured violations of the applicable NAAQS in the previous five years, and the approved SIP provides for a specific, reproducible approach to representing the air quality of the affected county in the absence of actual monitoring data.

(4) A $PM_{2.5}$SLAMS monitor which EPA has determined cannot be compared to the relevant NAAQS because of the siting of the monitor, in accordance with §58.30.

(5) A SLAMS monitor that is designed to measure concentrations upwind of an urban area for purposes of characterizing transport into the area and that has not recorded violations of the relevant NAAQS in the previous five years, if discontinuation of the monitor is tied to start-up of another station also characterizing transport.

(6) A SLAMS monitor not eligible for removal under any of the criteria in paragraphs (c)(1) through (c)(5) of this section may be moved to a nearby location with the same scale of representation if logistical problems beyond the State's control make it impossible to continue operation at its current site

Appendix C: Iowa Ambient Air Monitoring Sites

City	Site	Address	County	MSA	Latitude	Longitude	AQS Site ID	Responsible Agency
Buffalo	Linwood Mining	11100 110th Ave.	Scott	DMR	41.46724	-90.68845	191630017	DNR
Cedar Rapids	Kirkwood College	6301 Kirkwood Blvd SW	Linn	CDR	41.91056	-91.65194	191130028	Linn Local Prog.
	Scottish Rite Temple	616 A Ave.	Linn	CDR	41.98333	-91.66278	191130031	Linn Local Prog.
	Army Reserve Center	1599 Wenig Rd. NE	Linn	CDR	42.00833	-91.67861	191130037	Linn Local Prog.
	Public Health	500 11th St. NW	Linn	CDR	41.97677	-91.68766	191130040	Linn Local Prog.
Clinton	Chancy Park	23rd & Camanche	Clinton	-	41.82328	-90.21198	190450019	DNR
	Rainbow Park	Roosevelt St.	Clinton	-	41.87500	-90.17757	190450021	DNR
Clive	Indian Hills Jr. High School	9401 Indian Hills	Polk	DSM	41.60352	-93.74790	191532510	Polk Local Prog.
Coggon	Coggon Elementary School	408 E Linn St.	Linn	CDR	42.28056	-91.52694	191130033	Linn Local Prog.
Council Bluffs	Franklin School	3130 C Ave.	Pottawattamie	OMC	41.26417	-95.89612	191550009	DNR
	Griffin Pipe	8th Avenue and 27th St	Pottawattamie	OMC	41.25425	-95.88725	191550011	DNR
Davenport	Jefferson School	10th St. & Vine St.	Scott	DMR	41.53001	-90.58761	191630015	DNR
	Adams School	3029 N Division St.	Scott	DMR	41.55001	-90.60012	191630018	DNR
	Blackhawk Foundry	300 Wellman St.	Scott	DMR	41.51777	-90.61876	191630019	DNR
	Hayes School	622 South Concord St	Scott	DMR	41.51208	-90.62404	191630020	DNR
Des Moines	Health Dept.	1907 Carpenter	Polk	DSM	41.60318	-93.64330	191530030	Polk Local Prog.
Emmetsburg	Iowa Lakes College	Iowa Lakes Community College	Palo Alto	-	43.12370	-94.69352	191471002	DNR
Indianola	Lake Ahquabi State Park	1650 118th Ave.	Warren	DSM	41.28553	-93.58398	191810022	Polk Local Prog.
Iowa City	Hoover School	2200 East Court	Johnson	IAC	41.65723	-91.50348	191032001	DNR
Keokuk	Fire Station	111S. 13th St.	Lee	-	40.40096	-91.39101	191110008	DNR
Mason City	Holnam Cement	17th St. & Washington St.	Cerro Gordo	-	43.16944	-93.20243	190330018	DNR
	Washington School	700 N. Washington Avenue	Cerro Gordo	-	43.15856	-93.20301	190330020	DNR
Muscatine	Garfield School	1409 Wisconsin	Muscatine	-	41.40095	-91.06781	191390015	DNR
	Greenwood Cemetary	Fletcher St. & Kimble St.	Muscatine	-	41.41943	-91.07098	191390016	DNR
	Franklin School	210 Taylor St.	Muscatine	-	41.41439	-91.06261	191390018	DNR
	Musser Park	Oregon St. & Earl Ave.	Muscatine	-	41.40780	-91.06265	191390020	DNR
Pisgah	Forestry Office	206 Polk St.	Harrison	OMC	41.83226	-95.92819	190850007	DNR
	Highway Maintenance Shed	1575 Hwy 183	Harrison	OMC	41.78026	-95.94844	190851101	DNR
Sioux City	Bryant School	821 30th St.	Woodbury	SXC	42.52236	-96.40021	191930019	DNR
Slater	City Hall	105 Greene	Story	DSM	41.88287	-93.68780	191690011	Polk Local Prog.
Tama	Meskwaki Tribal Center	349 Meskwaki Road	Tama		41.98730	-92.65230	191710007	DNR
Waterloo	Grout Museum	West Park St. & South St.	Black Hawk	WTL	42.49306	-92.34389	190130008	DNR
	Water Tower	Vine St. & Steely	Black Hawk	WTL	42.50154	-92.31602	190130009	DNR
Waverly	Waverly Airport	Waverly Airport	Bremer	WTL	42.74306	-92.51306	190170011	Linn Local Prog.
-	Scott County Park	Scott County Park	Scott	DMR	41.69917	-90.52194	191630014	DNR
-	Backbone State Park	Backbone State Park	Delaware	-	42.60083	-91.53833	190550001	DNR
-	Viking Lake State Park	2780 Viking Lake Road	Montgomery	-	40.96911	-95.04495	191370002	DNR
-	Lake Sugema	24430 Lacey Trl, Keosauqua	Van Buren	-	40.69508	-92.00632	191770006	DNR

Site Table Definitions:

City – the city closest to the monitor location.

Site – the name of the monitoring site.

Address – an intersection or street address close to the monitoring site.

County – the county where the monitoring site resides.

MSA – Metropolitan Statistical Area. Iowa's Metropolitan Statistical Areas (MSA's) according to July, 2009 U.S. Census Bureau estimates:

U.S. Census Geographic area	Abbreviation
Omaha-Council Bluffs, NE-IA	OMC
Des Moines-West Des Moines, IA	DSM
Davenport-Moline-Rock Island, IA-IL	DMR
Cedar Rapids, IA	CDR
Waterloo-Cedar Falls, IA	WTL
Sioux City, IA-NE-SD	SXC
Iowa City, IA	IAC
Dubuque, IA	-
Ames, IA	-

From: http://www.census.gov/popest/metro/CBSA-est2009-annual.html Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2009 (CBSA-EST2009-01). Source: Population Division, U.S. Census Bureau, Release Date: March 2010

Maximum ozone concentrations are typically measured 10-30 miles downwind of an MSA. The site intended to record the maximum ozone concentration resulting from a given MSA may be located outside the MSA boundaries. Sites intended to measure background levels of pollutants for an MSA may also be located upwind and outside of that particular MSA.

Latitude – the latitude of a monitoring site**,** given in decimal degrees using the WGS (World Geodetic System) 84 datum.

Longitude – the longitude of a monitoring site, given in decimal degrees using the WGS (World Geodetic System) 84 datum.

AQS Site ID – The identifier of a monitoring site used in the US EPA Air Quality System (AQS) database. It has the form XX-XXX-XXXX where the first two digits specify the state (19 for Iowa), the next set of three digits the county, and the last four digits the site.

Responsible Agency – The agency responsible for performing ambient air monitoring at a monitoring site. The Polk County Local Program operates sites in or near Polk County. The Linn County Local Program operates sites in or near Linn County. The Department of Natural Resources (DNR) contracts with the State Hygienic Laboratory at the University of Iowa (SHL) to operate monitoring sites not operated by the Polk or Linn County Local Programs.

Appendix D: Iowa Ambient Air Monitors

Site Name	Pollutants Measured	Monitor Type	Design Value 08-10	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Backbone State Park	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Buffalo, Linwood Mining	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Cedar Rapids, Army Reserve	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Cedar Rapids, Army Reserve	PM2.5	SLAMS	31	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Cedar Rapids, Army Reserve	PM2.5 Speciation	Supplemental Speciation			PM2.5 Speciation	CSN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Army Reserve	Filter NO3	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Army Reserve	Filter SO4	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Kirkwood College	Ozone	SPM	62	No	UV Absorbtion		Continuous	Regional Transport	Urban	Yes
Cedar Rapids, Public Health	CO	SPM			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	Filter SO4	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Ozone	SPM			UV Absorbtion		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5	SPM	31	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	Yes
Cedar Rapids, Public Health	SO4	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Public Health	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Cedar Rapids, Scottish Rite Temple	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clinton, Chancy Park	PM2.5	SPM	31	Yes	Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	24 Hour Only
Clinton, Chancy Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Source Oriented	Middle	No
Clinton, Chancy Park	SO2	SPM			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Clinton, Rainbow Park	Ozone	SLAMS	63	No	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Clinton, Rainbow Park	PM2.5	SPM	30	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Clinton, Rainbow Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Clive, Indian Hills Jr. High Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Clive, Indian Hills Jr. High Sch.	PM2.5	SLAMS	28	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Coggon, Coggon Sch.	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Council Bluffs, Franklin Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Council Bluffs, Franklin Sch.	PM2.5	SPM	25	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Council Bluffs, Griffin Pipe	Pb	SLAMS			High Volume FRM	GFAA or ICP-MS	1/3 Day	Source Oriented	Middle	Yes
Davenport, Adams Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Adams Sch.	PM2.5	SPM	29	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Blackhawk Foundry	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Source Oriented	Middle	Yes
Davenport, Blackhawk Foundry	PM2.5	SLAMS	32	Yes	Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	24 Hour Only
Davenport, Blackhawk Foundry	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Source Oriented	Middle	No
Davenport, Hayes Sch.	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Urban	Yes
Davenport, Hayes Sch.	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Urban	No

Site Name	Pollutants Measured	Monitor Type	Design Value 07-09	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Davenport, Jefferson Sch.	CO	NCORE			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	NO2	SPM			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	Ozone	NCORE			UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	PM10	NCORE			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	PM2.5	NCORE	29	No	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	SO2	NCORE			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Davenport, Jefferson Sch.	Pb	SPM			High Volume FRM	GFAA or ICP-MS	1/6 Day	Population Exposure	Neighborhood	Yes
Davenport, Jefferson Sch.	Filter NO3	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Filter SO4	SPM			Low Volume	Ion Chromatography	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	NOy	NCORE			Chemiluminescence		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	PM2.5 Continuous	NCORE			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	PM2.5 Speciation	NCORE			PM2.5 Speciation	CSN Protocol	1/3 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	SO4	SPM			UV Fluorescent		Continuous	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Davenport, Jefferson Sch.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	CO	SPM			Non-Dispersive Infrared		Continuous	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	NO2	SPM			Chemiluminescence		Continuous	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	Ozone	SLAMS	56	No	UV Absorbtion		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5	SLAMS	26	No	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Des Moines, Health Dept.	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	PM2.5 Speciation	Supplemental Speciation			PM2.5 Speciation	CSN Protocol	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Filter NO3	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Filter SO4	SPM			Low Volume	Ion Chromatography	1/6 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	SO2	SPM			UV Fluorescent		Continuous	Population Exposure	Urban	Yes
Des Moines, Health Dept.	Toxics	SPM			Canister	TO-15, GC-FID	1/12 Day	Population Exposure	Neighborhood	No
Des Moines, Health Dept.	Toxics	SPM			Cartridge	TO-11A	1/12 Day	Population Exposure	Neighborhood	No
Emmetsburg, Iowa Lakes Coll.	Ozone	SLAMS	60	No	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5	SLAMS	22	No	Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Emmetsburg, Iowa Lakes Coll.	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	General/Background	Regional	No
Indianola, Lake Ahquabi	Ozone	SPM	61	No	UV Absorbtion		Continuous	Upwind Background	Regional	Yes
Iowa City, Hoover Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Iowa City, Hoover Sch.	PM2.5	SLAMS	29	No	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Iowa City, Hoover Sch.	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No

Site Name	Pollutants Measured	Monitor Type	Design Value 07-09	High Design Value?	Sampling Method	Analysis	Operating Schedule	Primary Monitoring Objective	Spatial Scale	NAAQS Comparable?
Keokuk, Fire Station	PM2.5	SPM	26	No	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Keosauqua, Lake Sugema	IMPROVE Speciation	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Regional Transport	Regional	No
Keosauqua, Lake Sugema	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Keosauqua, Lake Sugema	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Keosauqua, Lake Sugema	PM2.5	SLAMS	26	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Keosauqua, Lake Sugema	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Regional Transport	Regional	No
Keosauqua, Lake Sugema	SO2	SPM			UV Fluorescent		Continuous	General/Background	Regional	Yes
Mason City, Holcim Cement	PM10	SLAMS			Low Volume FRM	Gravimetric	Daily	Source Oriented	Middle	Yes
Mason City, Washington Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/2 Day	Population Exposure	Neighborhood	Yes
Muscatine, Franklin Sch.	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine, Garfield Sch.	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine, Garfield Sch.	PM2.5	SLAMS	37	Yes	Low Volume FRM	Gravimetric	Daily	Population Exposure	Neighborhood	Yes
Muscatine, Garfield Sch.	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Muscatine, Greenwood Cemetary	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Muscatine, Musser Park	SO2	SLAMS			UV Fluorescent		Continuous	Source Oriented	Middle	Yes
Muscatine, Musser Park	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Source Oriented	Middle	24 Hour Only
Pisgah, Forestry Office	Ozone	SPM			UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Pisgah, Highway Maintenance	Ozone	SLAMS	63	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Scott County Park	Ozone	SLAMS	63	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Sioux City, Bryant Sch.	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Sioux City, Bryant Sch.	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Slater, City Hall	Ozone	SLAMS	58	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes
Tama, Meskwaki Tribal Center	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Urban	Yes
Viking Lake State Park	IMPROVE Speciation	IMPROVE			IMPROVE Sampler	IMPROVE Protocol	1/3 Day	Regional Transport	Regional	No
Viking Lake State Park	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Regional Transport	Regional	Yes
Viking Lake State Park	PM10	SPM			Low Volume FRM	Gravimetric	1/3 Day	General/Background	Regional	Yes
Viking Lake State Park	PM2.5	SLAMS	22	No	Low Volume FRM	Gravimetric	1/3 Day	Regional Transport	Regional	Yes
Viking Lake State Park	PM2.5 Continuous	SPM			PM2.5 Continuous	BAM or TEOM	Continuous	Regional Transport	Regional	No
Waterloo, Grout Museum	PM10	SLAMS			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Grout Museum	PM2.5	SLAMS	31	Yes	Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Water Tower	PM2.5	SPM			Low Volume FRM	Gravimetric	1/3 Day	Population Exposure	Neighborhood	Yes
Waterloo, Water Tower	PM2.5 Continuous	SLAMS			PM2.5 Continuous	BAM or TEOM	Continuous	Population Exposure	Neighborhood	No
Waverly, Airport	Ozone	SLAMS	62	No	UV Absorbtion		Continuous	Max Ozone Conc.	Urban	Yes

Monitor Table Definitions:

Site Name – a combination of the city and site name from the previous table

Pollutants Measured – indicates the pollutant, or set of pollutants, measured by each monitor

- CO – carbon monoxide
- IMPROVE - Interagency Monitoring of Protected Visual Environments; a federal program to protect visibility in national parks
- IMPROVE speciation – a speciation monitor and suite of lab analysis procedures developed by the IMPROVE program to identify and quantify the chemical components of $PM_{2.5}$
- NH_3 – ammonia
- NO_2 – nitrogen dioxide
- NO_3 – the nitrate anion
- NOy – reactive nitrogen; NO and its oxidation products; a common definition is:
  $NOy = NO+NO_2+HNO_3+NO_3$ (aerosol) + NO_3 (radical) + $N_2O_5+HNO_4$ + PAN + other organic nitrates
- Ozone – an unstable molecule consisting of three oxygen atoms
- PAN- peroxyacyl nitrates
- Pb - lead
- PM_{10} – particles with a diameter of 10 micrometers or less
- $PM_{2.5}$ – particles with a diameter of 2.5 micrometers or less, also known as “fine particles”.
- $PM_{2.5}$ speciation – a speciation monitor and suite of lab analysis procedures developed by EPA for their national speciation trends network (STN), to identify and quantify the chemical components of $PM_{2.5}$
- SO_2 – sulfur dioxide
- SO_4 – the sulfate anion
- Toxics – sampling that quantifies volatile organic compounds (VOC’s), and carbonyls, including some known urban air toxics

Monitor Type – This column indicates how the monitor is classified in the AQS database.

- IMPROVE – a speciation monitor developed by the IMPROVE program to identify and quantify the chemical components of $PM_{2.5}$.
- Proposed NCore – monitors operated at a site which has been proposed for inclusion in EPA’s national network of long term multi-pollutant sites (NCore).
- SLAMS – State and Local Air Monitoring Stations. SLAMS make up the ambient air quality monitoring sites that are primarily needed for NAAQS comparisons, but may serve other data purposes. SLAMS exclude special purpose monitor (SPM) stations and include NCore, and all other State or locally operated stations that have not been designated as SPM stations.
- SPM – means a monitor that is designated as a special purpose monitor in the monitoring network plan and in EPA’s AQS database. SPM monitors do not count when showing compliance with minimum SLAMS requirements for monitor numbers and siting.
- Supplemental Speciation – a speciation site with monitors that are operated according to CSN protocols, but not contained in the STN Network.

Design Value – A design value is a number computed from monitoring data (see 40 CFR Part 50, Appendix N) that is used to compare air quality at the site to the National Ambient Air Quality Standards (NAAQS).

High Design Value? – A "Yes" in this column indicates that the design value is within 85% of the NAAQS. For $PM_{2.5}$, 24 hour design values of 30 $\mu g/m^3$ or greater are considered greater than or equal to 85% of the 24-hour NAAQS (35 $\mu g/m^3$). For ozone, 8-hour design values of 64 ppb or greater are considered greater than or equal to 85% of the 8-hour NAAQS (75 ppb).

Sampling Method – Indicates how the sample is collected. This column also shows how the sample is analyzed, if it is analyzed on site at the time of collection.

- Continuous $PM_{2.5}$- a monitor that reports $PM_{2.5}$ levels in real time. Continuous $PM_{2.5}$ monitors typically have three components: a size selective inlet (cyclone) that knocks out all but the fine particles, a conditioning system that rapidly dries the fine particles, and a mass measurement system that determines the mass of the conditioned sample. The two types of continuous $PM_{2.5}$ monitors currently used in the Iowa Network are the $PM_{2.5}$ FDMS TEOM (FDMS=Filter Dynamic Measurement System, TEOM= Tapered Element Oscillating Microbalance) and the $PM_{2.5}$ BAM (BAM=Beta Attenuation Monitor).
    - $PM_{2.5}$ FDMS – a continuous fine particle monitor that that uses a heater and dehumidifier to condition fine particles and a TEOM microbalance to weigh the fine particles. This type of monitor corrects for volatilization losses during sampling by measuring the change in the mass of the fine particles collected on the sampling filter after the fine particle flow is switched off.
    - $PM_{2.5}$ BAM- A continuous fine particle monitor that conditions particles using a heater that is actuated when the relative humidity exceeds 35%. Mass measurements are made by measuring the attenuation of beta particles caused by fine particles collected on a sampling tape during the sampling period.
- Canister – Specially treated stainless steel canisters are used to collect VOC's.
- Cartridge – A 2,4-Dinitrophenylhydrazine (DNPH) cartridge is used to collect toxics that contain a carbonyl group.
- Chemiluminescence – When a nitric oxide (NO) molecule collides with an ozone molecule, a nitrogen dioxide (NO_2) molecule and an oxygen (O_2) molecule result. The NO_2 molecule is in an excited state, and subsequently emits infrared light that can be measured by a photomultiplier tube. This property is the basis of the analytical method used to quantify NO. To measure NO_2, the NO_2 must first be converted to NO using a heated molybdenum converter. To measure Nitrate, the collected particulate is heated rapidly, and the vaporization/decomposition process converts the particulate nitrate contained in the collected sample to nitrogen oxides, which are quantified by the chemiluminescence method.
- IMPROVE Sampler – See IMPROVE in the "Pollutants Measured" section above.
- Low Volume – a sampler that uses a flow of 16.67 liters per minute.
- Low Volume FRM – a sampler that uses a flow of 16.67 liters per minute, which has been designated as a Federal Reference Method.
- Non-Dispersive Infrared – Carbon Monoxide absorbs infrared radiation; this property is the basis of the analytical method used by continuous CO monitors to quantify CO concentrations.
- $PM_{2.5}$ Speciation – See $PM_{2.5}$ Speciation in the "Pollutants Measured" section above.

- UV Absorption – Ozone absorbs ultraviolet light; this property is the basis of the analytical method used by continuous ozone monitors to quantify ozone concentrations.
- UV Fluorescent – When excited by ultraviolet light, SO_2 molecules emit light at a lower frequency that may be detected by a photomultiplier tube. This property is the basis for the analytical method used for both continuous SO_2 gas analyzers, as well as continuous particulate sulfate monitors. In the latter case, sulfate particles are first converted to SO_2 gas.

Analysis – indicates the method of post-collection analysis that is done in a lab environment.

- GFAA – Graphite Furnace Atomic Absorption is used to measure the concentration of trace metals. The sample is placed in a graphite tube and heated to atomize the sample. Light of a wavelength that is absorbed by the metal atoms of interest is directed down the tube. The amount of light absorbed is proportional to the concentration of metal atoms.
- Gravimetric – A filter is weighed before and after collecting a particulate sample.
- ICP/MS – Inductively Coupled Plasma Mass Spectrometry is a highly sensitive analytical technique capable of determining a range of metals. The metal sample is atomized and ionized by argon plasma, and the ions are separated and quantified via a mass spectrometer.
- IMPROVE Protocol – This protocol uses a suite of analytical procedures (X-Ray Fluorescence, Ion Chromatography, and Thermal Optical Reflectance) to identify and quantify the components of $PM_{2.5}$. See http://vista.cira.colostate.edu/improve/ for further details.
- Ion Chromatography – a liquid chromatography method used to analyze the extract from filters for the nitrate and sulfate anion.
- CSN Protocol – refers to EPA's chemical speciation network protocol. This protocol utilizes X-Ray Fluorescence, Ion Chromatography, and Thermal Optical Reflectance to identify and quantify the components of $PM_{2.5}$.
- Thermal Optical Reflectance- a carbon containing sample is subjected to a programmed, progressive heating in a controlled atmosphere, and the evolved carbon at each step is quantified by a flame ionization detector. Organic carbon (OC) evolves from the sample without an oxygen atmosphere for combustion, Elemental Carbon (EC) does not. A laser is used to detect charring in the sample, so that the charring of the high temperature OC component does not result in an over estimation of the EC in the sample.
- TO-11A – an EPA protocol in which carbonyl cartridge extracts are analyzed using High Performance Liquid Chromatography and an ultraviolet detector.
- TO-15, GC-FID – These analysis methods are used for air samples collected in specially treated stainless steel canisters. EPA protocol TO-15 is used for UATMP (Urban Air Toxics Monitoring Program) compounds. According to method TO-15, toxic gases are separated with a gas chromatograph, and quantified by a mass spectrometer (GCMS). The SNMOC (Speciated Non-Methane Organic Carbon) pollutants are also separated by a gas chromatograph, but are quantified by a flame ionization detector (GC-FID).
- X-Ray Fluorescence-when illuminated with x-rays, metallic atoms emit characteristic fluorescent radiation, which may be quantified with a semiconductor detector or gas proportional counter to obtain metallic concentrations in a filter sample.

Operating Schedule – Continuous monitors run constantly and measure hourly average concentrations in real time. Manual samplers, such as PM filter samplers or toxics samplers, collect a single 24 hour sample from midnight to midnight on a particular day, which is quantified later in an analytical laboratory. A fractional (e.g. 1/3, 1/6, and 1/12) schedule for a manual samplers refers to collecting a sample every third, sixth, and twelfth day, respectively. Ozone monitors in Iowa are operated only during ozone season (April to October) when higher temperatures favor ozone formation. Cartridges for toxic carbonyl compounds are normally collected every twelfth day, but the schedule is accelerated to 1/6 days during ozone season.

Monitoring Objective – the primary reason a monitor is operated at a particular location.

- General Background – The objective is to establish the background levels of a pollutant.
- Highest Conc. – The objective is to measure at a site where the concentration of the pollutant is highest.
- Max. Ozone Conc. – The objective is to record the maximum ozone concentration. Because ozone is a secondary pollutant, ozone concentrations are typically highest 10-30 miles downwind of an urban area.
- Population Exposure – The objective is to monitor the exposure of individuals in the area represented by the monitor.
- Regional Transport – The objective is to assess the extent to which pollutants are transported between two regions that are separated by tens to hundreds of kilometers.
- Source Oriented – The objective is to determine the impact of a nearby source.
- Transport – The objective is to assess the extent to which pollutants are transported from one location to another.
- Upwind Background – The objective is to establish the background levels of a pollutant, typically upwind of a source or urban area.

Spatial Scale – The scale of representativeness is described in terms of the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. Monitors are classified according to the largest applicable scale below:

- Microscale - defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
- Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometer.
- Neighborhood scale - defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometers range. The neighborhood and urban scales listed below have the potential to overlap in applications that concern secondarily formed or homogeneously distributed air pollutants.
- Urban scale - defines concentrations within an area of city-like dimensions, on the order of 4 to 50 kilometers. Within a city, the geographic placement of sources may result in there being no single site that can be said to represent air quality on an urban scale.
- Regional scale – usually defines a rural area of reasonably homogeneous geography without large sources, and extends from tens to hundreds of kilometers.

NAAQS Comparable? - This column shows whether the data from the monitor can be compared to the National Ambient Air Quality Standards (NAAQS). Entries under this column are Yes, No, and 24 Hour Only. For a monitor's data to be eligible for comparison against the NAAQS, the type of monitor used must be defined as a federal reference method or federal equivalent method by EPA.

EPA has designated the BAM-1020 as a Federal Equivalent Method (FEM) for $PM_{2.5}$ when configured and operated as prescribed in the federal equivalence designation. Iowa operates several BAM-1020 analyzers, but they are not configured in accordance with the designation, and the data cannot be compared with the NAAQS. EPA has designated some models of the TEOM as a Federal Equivalent Method (FEM) for $PM_{2.5}$ when configured and operated as prescribed in the federal equivalence designation. Iowa operates several TEOM analyzers, but they are not configured in accordance with the designation, and the data cannot be compared with the NAAQS.

For $PM_{2.5}$, there is both an annual and a 24 hour NAAQS. To be comparable to either $PM_{2.5}$ NAAQS a site must be population-oriented. In 40 CFR Part 58, EPA defines a population-oriented monitoring site as follows:

Population-oriented monitoring (or sites) means residential areas, commercial areas, recreational areas, industrial areas where workers from more than one company are located, and other areas where a substantial number of people may spend a significant fraction of their day.

Following this definition, all $PM_{2.5}$ monitoring sites in Iowa are population-oriented.

In a populated area near an industrial source, monitoring data may only be comparable to the 24 hour $PM_{2.5}$ NAAQS. According to Subpart D of 40 CFR Part 58:

$PM_{2.5}$ data that are representative, not of areawide but rather, of relatively unique population-oriented microscale, or localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS. For example, if the $PM_{2.5}$ monitoring site is adjacent to a unique dominating local $PM_{2.5}$ source or can be shown to have average 24-hour concentrations representative of a smaller than neighborhood spatial scale, then data from a monitor at the site would only be eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.

Appendix E: Population-Based Minimum Monitoring Requirements

Ozone

40 CFR Part 58 Appendix D, Table D-2 specifies the minimum number of SLAMS (State and Local Air Monitoring Stations) ozone monitors required based on population and the most recent three years of monitoring data (design value).

TABLE D–2 OF APPENDIX D TO PART 58.— SLAMS MINIMUM O_3 MONITORING REQUIREMENTS

MSA population[1,2]	Most recent 3-year design value concentrations ≥85% of any O_3 NAAQS[3]	Most recent 3-year design value concentrations <85% of any O_3 NAAQS[3,4]
>10 million	4	2
4–10 million	3	1
350,000–<4 million	2	1
50,000–<350,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA).
[2]Population based on latest available census figures.
[3]The ozone (O3) National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

$PM_{2.5}$

40 CFR Part 58 Appendix D, Table D-5 specifies the minimum number of SLAMS $PM_{2.5}$ monitors required based on population and 3-year design values.

TABLE D–5 OF APPENDIX D TO PART 58. $PM_{2.5}$ MINIMUM MONITORING REQUIREMENTS

MSA population[1,2]	Most recent 3-year design value ≥85% of any $PM_{2.5}$ NAAQS[3]	Most recent 3-year design value <85% of any $PM_{2.5}$ NAAQS[3,4]
>1,000,000	3	2
500,000–1,000,000	2	1
50,000–<500,000[5]	1	0

[1]Minimum monitoring requirements apply to the Metropolitan statistical area (MSA)
[2]Population based on latest available census figures.
[3]The PM2.5 National Ambient Air Quality Standards (NAAQS) levels and forms are defined in 40 CFR Part 50.
[4]These minimum monitoring requirements apply in the absence of a design value.
[5]Metropolitan statistical areas (MSA) must contain an urbanized area of 50,000 or more population.

PM_{10}

40 CFR Part 58 Appendix D, Table D-4 lists the minimum requirements for the number of PM_{10} stations per MSA based on population and measured levels:

TABLE D–4 OF APPENDIX D TO PART 58. PM10 MINIMUM MONITORING REQUIREMENTS (NUMBER OF STATIONS PER MSA)[1]

Population category	High concentration[2]	Medium concentration[3]	Low concentration[4,5]
>1,000,000	6–10	4–8	2–4
500,000–1,000,000	4–8	2–4	1–2
250,000–500,000	3–4	1–2	0–1
100,000–250,000	1–2	0–1	0

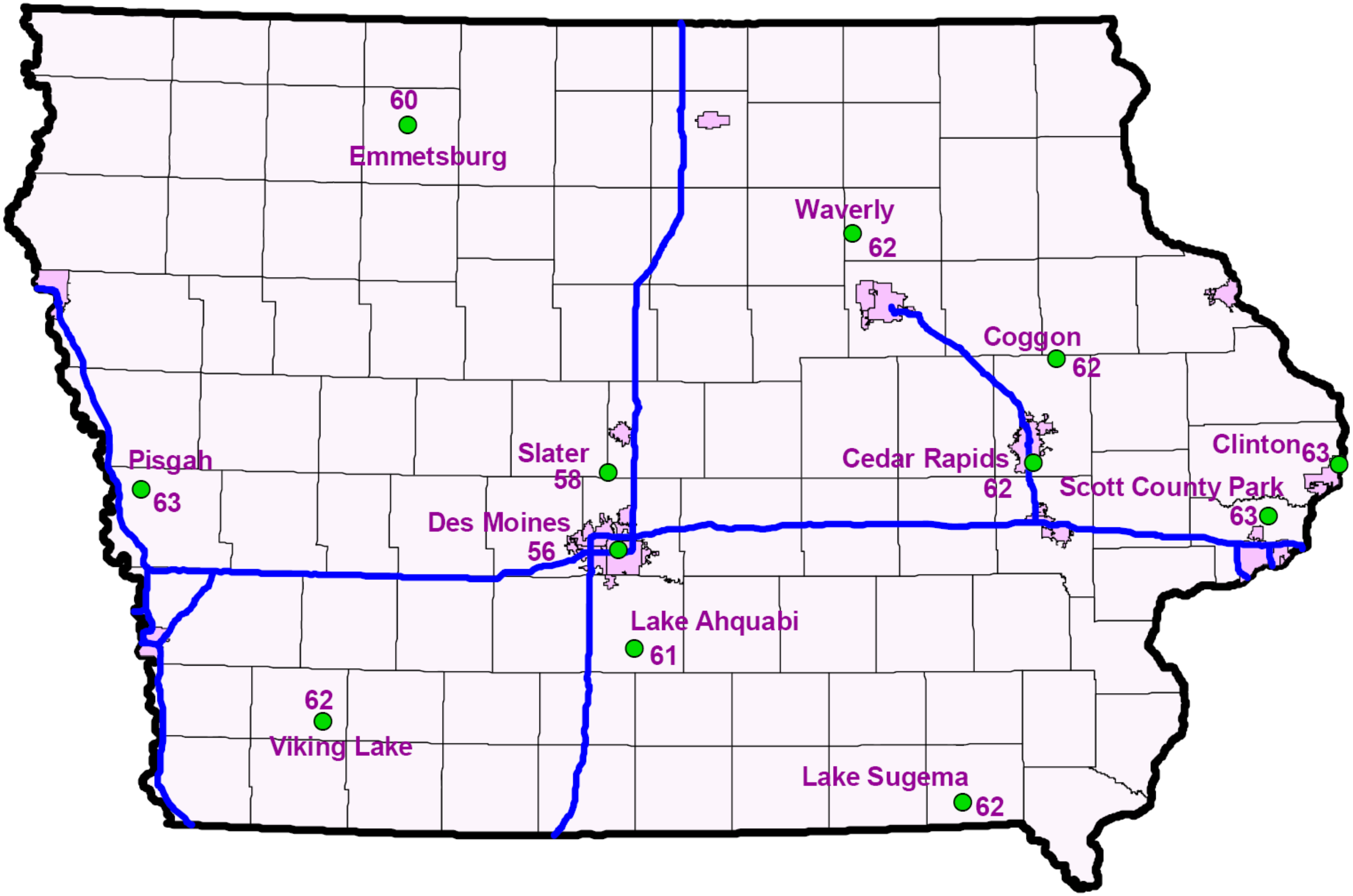
[1]Selection of urban areas and actual numbers of stations per area within the ranges shown in this table will be jointly determined by EPA and the State Agency.
[2]High concentration areas are those for which ambient PM10 data show ambient concentrations exceeding the PM10 NAAQS by 20 percent or more.
[3]Medium concentration areas are those for which ambient PM10 data show ambient concentrations exceeding 80 percent of the PM10 NAAQS.
[4]Low concentration areas are those for which ambient PM10 data show ambient concentrations less than 80 percent of the PM10 NAAQS.
[5]These minimum monitoring requirements apply in the absence of a design value.

Appendix F: Census Bureau Estimates for Iowa MSA's

US Census Geographic Area	US Census Population Estimate, 2010
Omaha-Council Bluffs, NE-IA	865,350
Des Moines-West Des Moines, IA	569,633
Davenport-Moline-Rock Island, IA-IL	379,690
Cedar Rapids, IA	257,940
Waterloo-Cedar Falls, IA	167,819
Iowa City, IA	152,586
Sioux City, IA-NE	143,577
Dubuque, IA	93,653
Ames, IA	89,542

From:
http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_NSRD_GCTPL2.US24PR&prodType=table

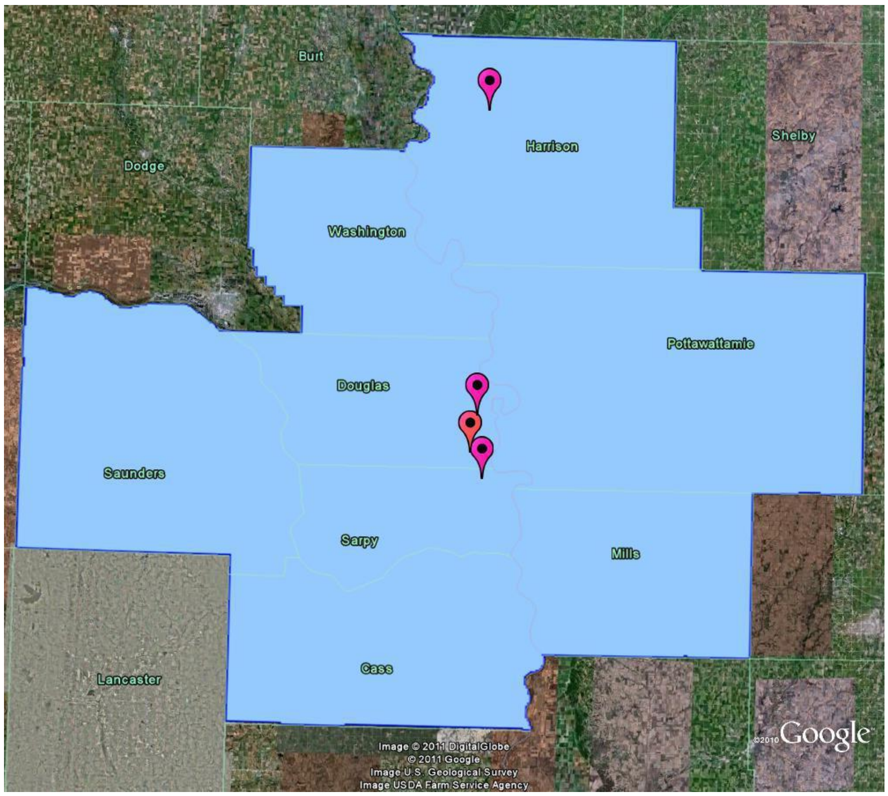
Appendix G: Design Value Map for Ozone



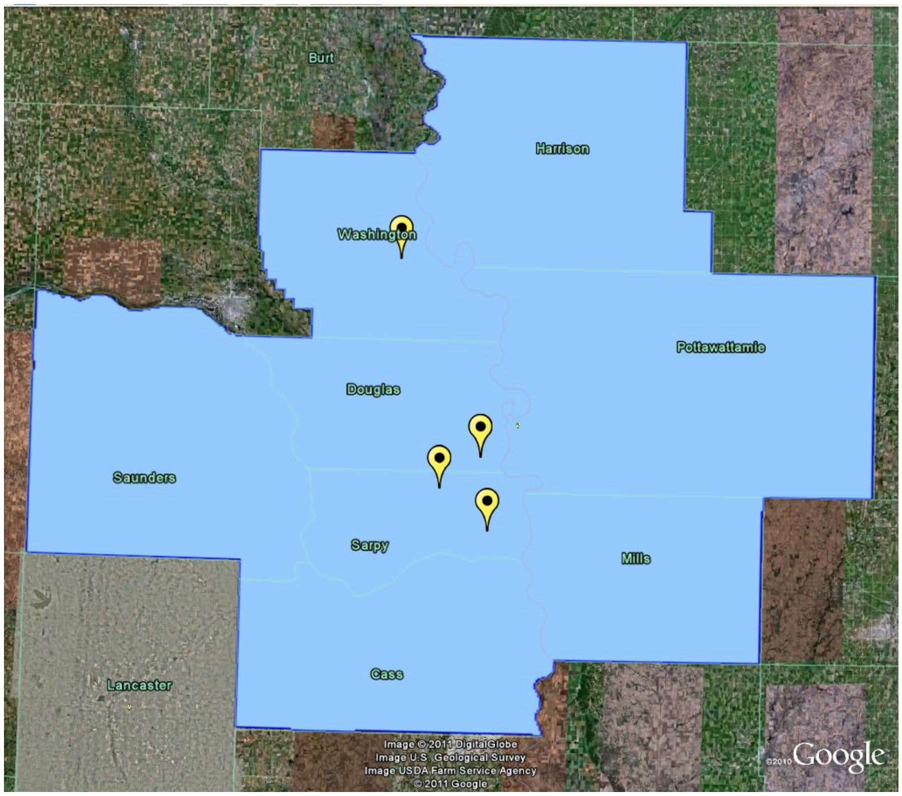
2008-2010 Ozone Design Values (ppb)

Appendix H: Maps of Monitoring Locations in MSA's on the State Border

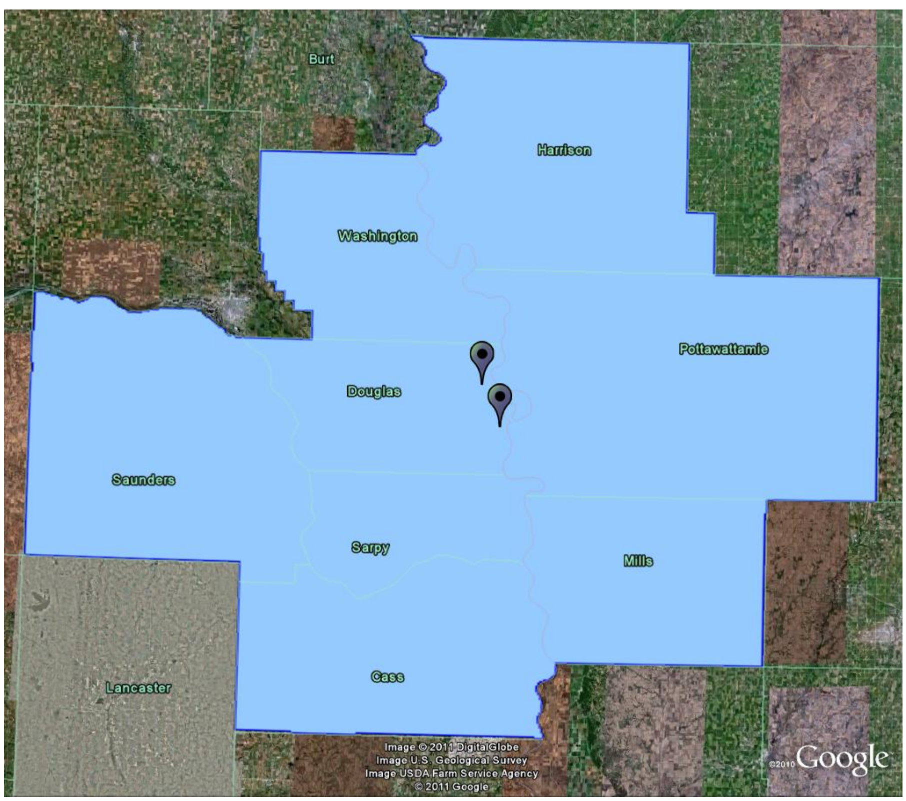
Iowa includes portions of three MSA's that it shares with other states; Davenport-Moline-Rock Island, IA-IL; Omaha-Council Bluffs, NE-IA; and Sioux City, NE-IA-SD. The following maps show all the locations for SLAMS monitors that were operated in 2011 for ozone; and 2010 for $PM_{2.5}$, SO_2, and PM_{10} in these metro areas, including those operated by South Dakota, Illinois, and Nebraska.



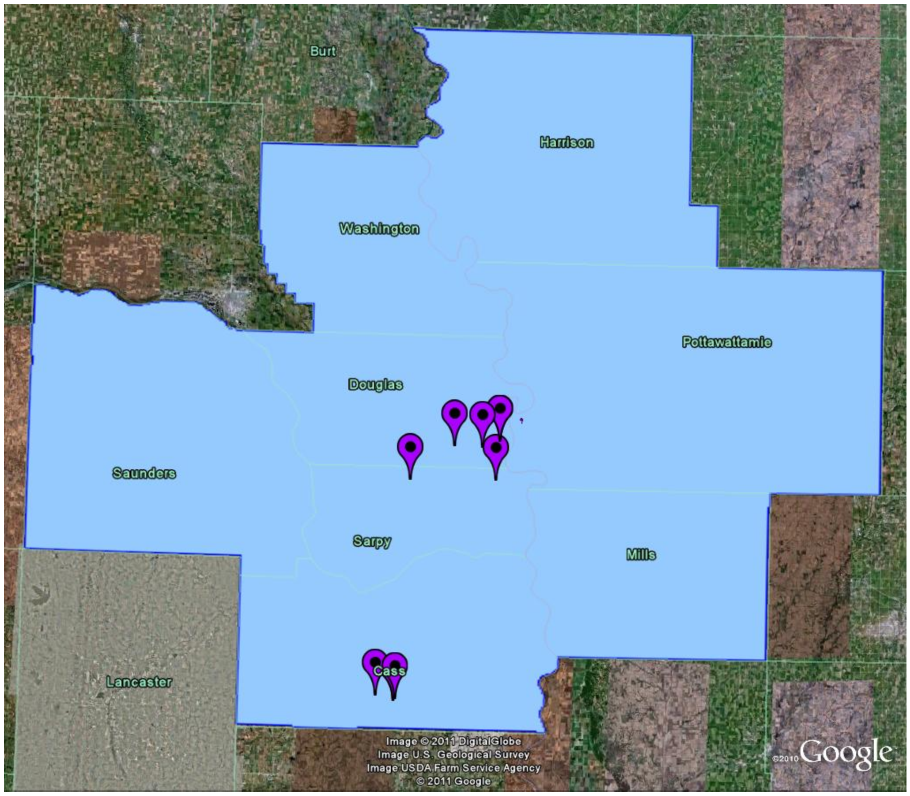
Omaha-Council Bluffs, NE-IA Ozone SLAMS Monitors



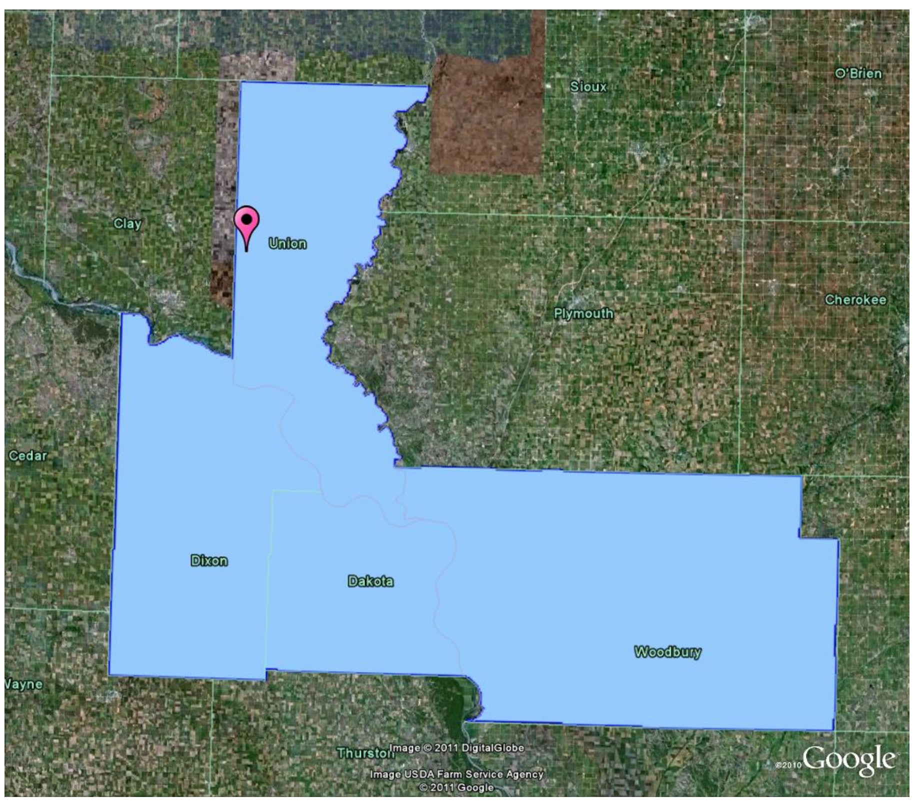
Omaha-Council Bluffs, NE-IA $PM_{2.5}$ SLAMS Monitors



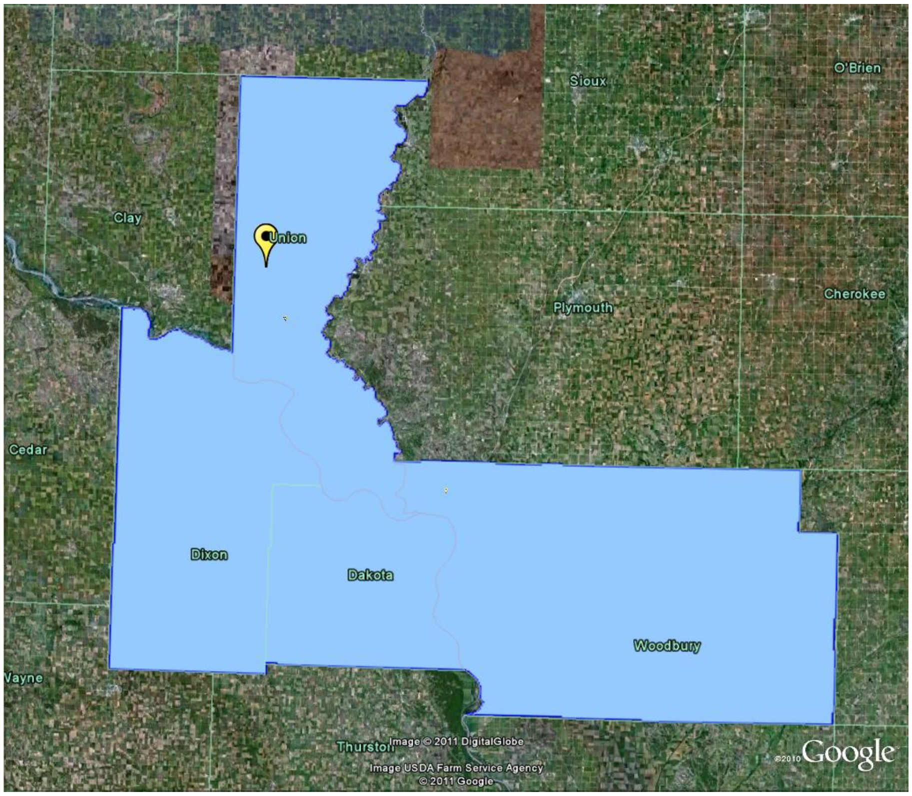
Omaha-Council Bluffs, NE-IA SO_2 SLAMS Monitors



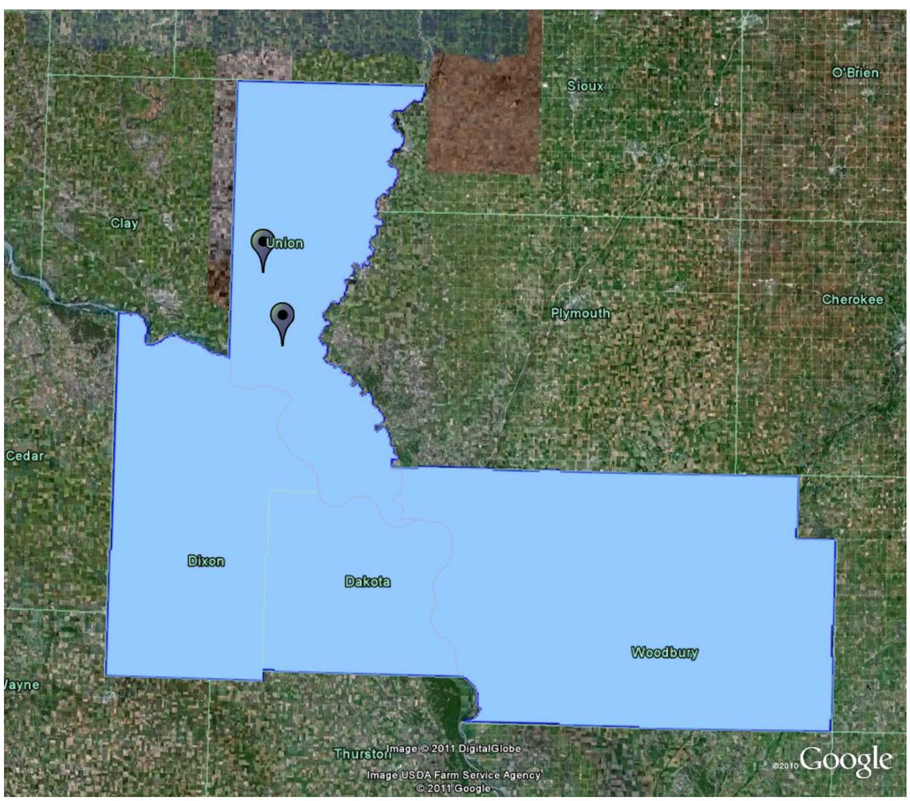
Omaha-Council Bluffs, NE-IA PM_{10} SLAMS Monitors



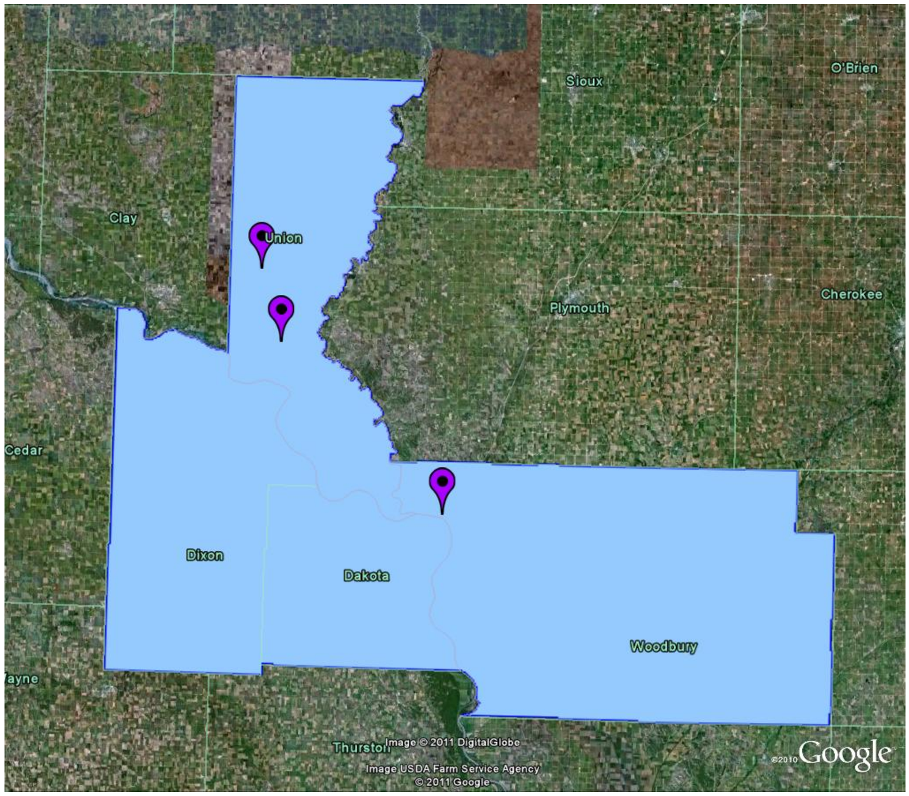
Sioux City, IA-NE-SD Ozone SLAMS Monitors



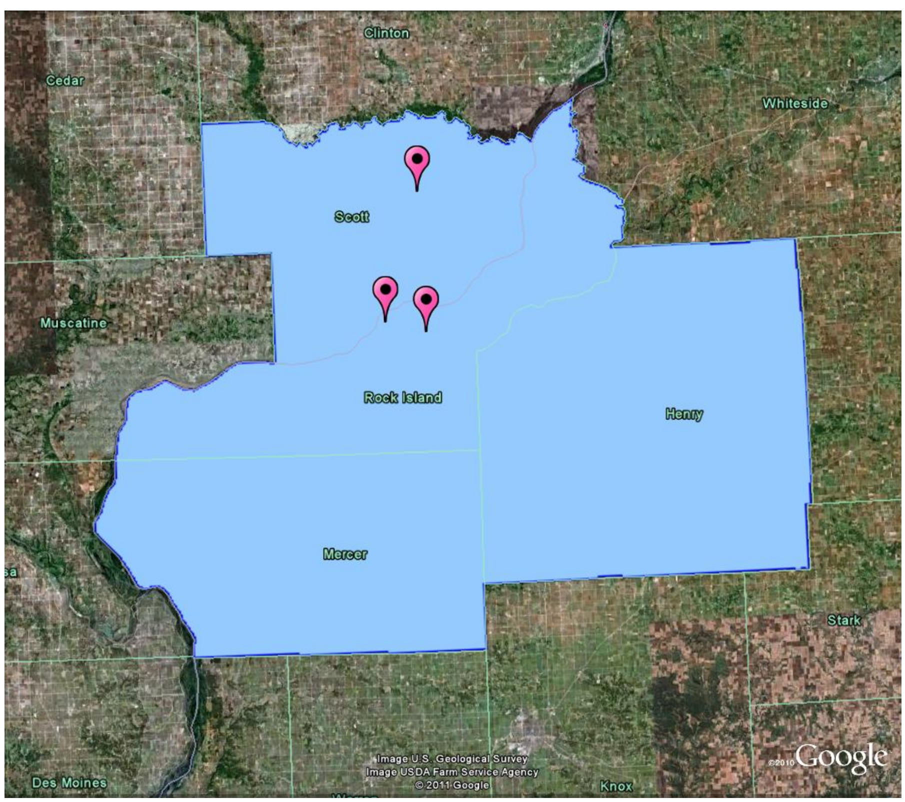
Sioux City, IA-NE-SD PM$_{2.5}$ SLAMS Monitors



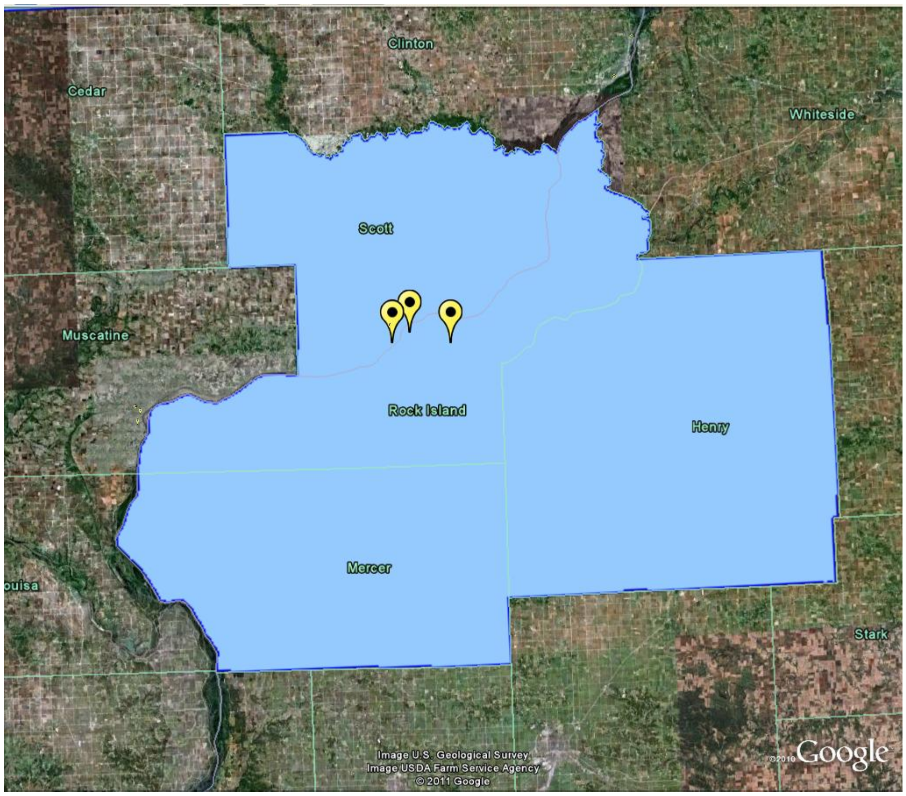
Sioux City, IA-NE-SD SO$_2$ SLAMS Monitors



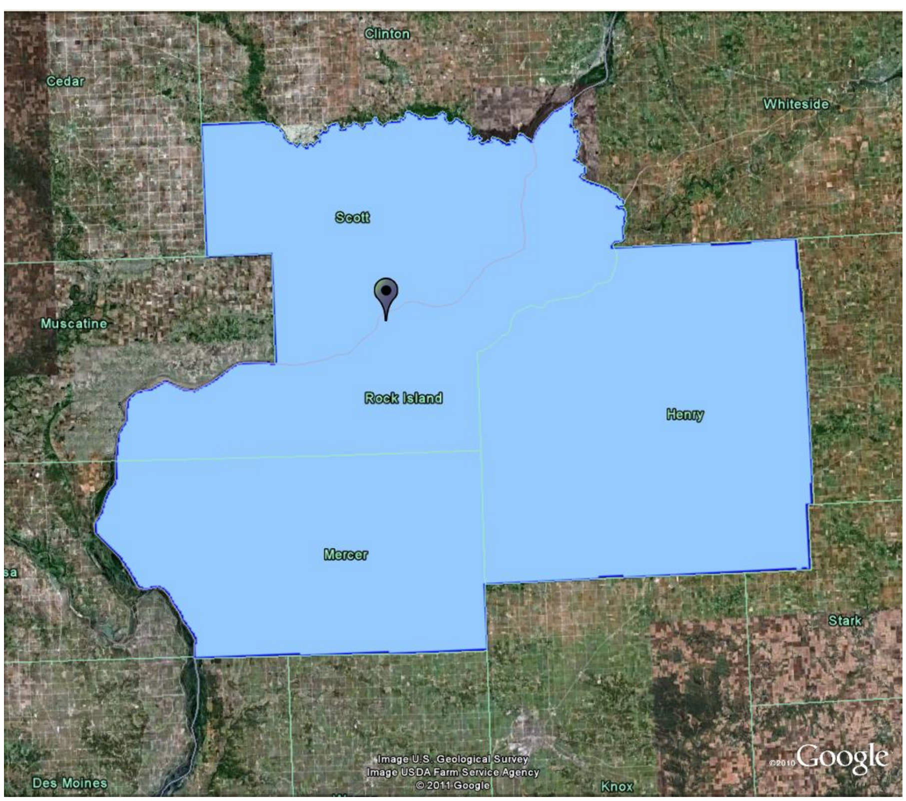
Sioux City, IA-NE-SD PM10 SLAMS Monitors



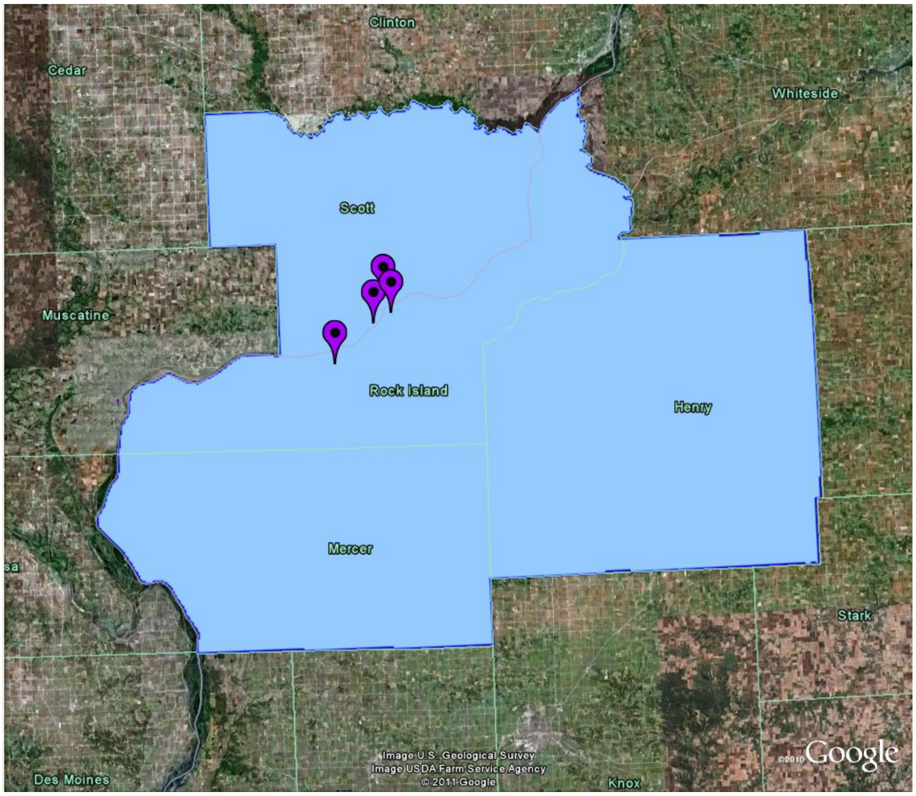
Davenport-Moline-Rock Island, IA-IL Ozone SLAMS Monitors



Davenport-Moline-Rock Island, IA-IL $PM_{2.5}$ SLAMS Monitors



Davenport-Moline-Rock Island, IA-IL SO_2 SLAMS Monitors



Davenport-Moline-Rock Island, IA-IL PM_{10} SLAMS Monitors

Appendix I: Network Change Table

The IDNR proposes to consolidate two sites in the Cedar Rapids MSA, two sites in the Waterloo MSA, and to make additional changes to the network that are detailed below.

Consolidation of sites in the Cedar Rapids MSA

The consolidation of sites in the Cedar Rapids MSA involves moving monitors from the Army Reserve site (19-113-0037) to the multi-pollutant Health Department site (19-113-0040). Subject to EPA approval, the move will occur on January 1, 2012. The Health Department site is located about 2.2 miles south-southwest of the Army Reserve site.

The only SLAMS monitors at the Army Reserve site are a $PM_{2.5}$ FRM and PM_{10} sampler. A list of specific conditions under which EPA may approve modifications to the SLAMs network are enumerated in 40 CFR Part 58, section 58.14, paragraphs (c)(1) through (c)(6). According to paragraph (c), if none of the conditions listed in paragraphs (c)(1) through (c)(6) are fulfilled "Other requests for discontinuation may also be approved on a case-by-case basis if discontinuance does not compromise data collection needed for implementation of a NAAQS and if the requirements of Appendix D to this part, if any, continue to be met."

As detailed in the $PM_{2.5}$ Monitoring Network Analysis section of this document, the Cedar Rapids MSA requires one FRM/FEM $PM_{2.5}$ monitor, as well as one continuous $PM_{2.5}$ monitor. The minimum $PM_{2.5}$ monitoring requirements for the Cedar Rapids MSA will not be compromised by the move of the SLAMS $PM_{2.5}$ FRM sampler. The move will not result in a decrease in the number of SLAMS $PM_{2.5}$ samplers in the Cedar Rapids MSA. The classifications for "Primary Monitoring Objective" (Population Exposure), and "Spatial Scale" (Neighborhood) will remain the same. Currently there is no continuous $PM_{2.5}$ sampler at the Army Reserve site. The Army Reserve site is a rooftop site without a trailer or shelter, so it's impractical to install a continuous $PM_{2.5}$ sampler there. Since a continuous $PM_{2.5}$ monitor is already installed in the permanent shelter at the Health Department, the move will allow for more accurate comparisons between discrete and continuous $PM_{2.5}$. The 2008-2010 design values from the $PM_{2.5}$ FRM SLAMS sampler at Army Reserve are 31 $\mu g/m^3$ (24-hour) and 10.0 $\mu g/m^3$ (annual).

As detailed in the PM_{10} Monitoring Network Analysis section of this document, the Cedar Rapids MSA requires 0-1 PM_{10} monitors. The minimum PM_{10} monitoring requirements for the Cedar Rapids MSA will not be compromised by the move of the SLAMS PM_{10} sampler. The move will not result in a decrease in the number of SLAMS PM_{10} samplers in the Cedar Rapids MSA. The classifications for "Primary Monitoring Objective" (Population Exposure) and "Spatial Scale" (Neighborhood) will remain the same.

The changes proposed for sites in the Cedar Rapids MSA are indicated below:

Site Name	Pollutant	Monitor Type	Sampling Method	Analysis	NAAQS Comparable?	Operating Schedule	Action
Cedar Rapids, Army Reserve	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Deletion *
Cedar Rapids, Army Reserve	PM2.5	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Deletion *
Cedar Rapids, Public Health	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Addition *
Cedar Rapids, Public Health	PM2.5	SLAMS	Low Volume FRM	Gravimetric	Yes	Daily	Addition *
Cedar Rapids, Army Reserve	Filter NO3	SPM	Low Volume	Ion Chromatography	No	1/6 Day	Deletion *
Cedar Rapids, Army Reserve	Filter SO4	SPM	Low Volume	Ion Chromatography	No	1/6 Day	Deletion *
Cedar Rapids, Public Health	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	Daily	Deletion *
Cedar Rapids, Public Health	Filter NO3	SPM	Low Volume	Ion Chromatography	No	1/6 Day	Addition *
Cedar Rapids, Public Health	Filter SO4	SPM	Low Volume	Ion Chromatography	No	1/3 Day	Deletion
Cedar Rapids, Public Health	Filter SO4	SPM	Low Volume	Ion Chromatography	No	1/6 Day	Addition *
Cedar Rapids, Public Health	SO4	SPM	UV Fluorescent		No	Continuous	Deletion
Cedar Rapids, Army Reserve	PM2.5 Speciation	Supplemental Speciation	PM2.5 Speciation	CSN Protocol	No	1/6 Day	Deletion *
Cedar Rapids, Public Health	PM2.5 Speciation	Supplemental Speciation	PM2.5 Speciation	CSN Protocol	No	1/6 Day	Addition *

* Contingent upon EPA's approval of the re-location of SLAMS monitors from Cedar Rapids, Army Reserve to Cedar Rapids, Public Health sites.

See Appendix D for definitions of the elements in this table.

Consolidation of sites in the Waterloo MSA

The consolidation of sites in the Waterloo MSA involves moving monitors from the Grout Museum site (19-013-0008) to the Water Tower site (19-013-0009). Subject to EPA approval, the move will occur on January 1, 2012. The Water Tower site is located about 1.5 miles east-northeast of the Grout Museum site. The only SLAMS monitors at the Grout Museum site are a $PM_{2.5}$ FRM and PM_{10} sampler.

As detailed in the $PM_{2.5}$ Monitoring Network Analysis section of this document, the Waterloo MSA requires one FRM/FEM $PM_{2.5}$ monitor, as well as one continuous $PM_{2.5}$ monitor. The minimum $PM_{2.5}$ monitoring requirements for the Waterloo MSA will not be compromised by the move of the SLAMS $PM_{2.5}$ FRM sampler. The move will not result in a decrease in the number of SLAMS $PM_{2.5}$ samplers in the Waterloo MSA. The classifications for "Primary Monitoring Objective" (Population Exposure), and "Spatial Scale" (Neighborhood) will remain the same. Currently there is no continuous $PM_{2.5}$ sampler at the Grout Museum site. The Grout Museum site is a rooftop site without a trailer or shelter, so it is impractical to install a continuous $PM_{2.5}$ sampler there. Since a continuous $PM_{2.5}$ monitor is already installed in the trailer at the Water Tower site, the move will allow for more accurate comparisons between discrete and continuous $PM_{2.5}$. The 2008-2010 design values from the $PM_{2.5}$ FRM SLAMS sampler at Grout Museum are 31 $\mu g/m^3$ (24 hour) and 10.6 $\mu g/m^3$ (annual).

As detailed in the PM_{10} Monitoring Network Analysis section of this document, the Waterloo MSA does not require a PM_{10} monitor. Therefore, the minimum PM_{10} monitoring requirements for the Waterloo MSA will not be compromised by the move of the SLAMS PM_{10} sampler. The move will not result in a decrease in the number of SLAMS PM_{10} samplers in the Waterloo MSA. The classifications for "Primary Monitoring Objective" (Population Exposure) and "Spatial Scale" (Neighborhood) will remain the same.

The changes proposed for sites in the Waterloo MSA are indicated below:

Site Name	Pollutant	Monitor Type	Sampling Method	Analysis	NAAQS Comparable?	Operating Schedule	Action
Waterloo, Grout Museum	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Deletion *
Waterloo, Grout Museum	PM2.5	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Deletion *
Waterloo, Water Tower	PM2.5	SPM	Low Volume FRM	Gravimetric	Yes	1/3 Day	Deletion *
Waterloo, Water Tower	PM10	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Addition *
Waterloo, Water Tower	PM2.5	SLAMS	Low Volume FRM	Gravimetric	Yes	1/3 Day	Addition *

* Contingent upon EPA's approval of the re-location of SLAMS monitors from Waterloo, Grout Museum to Waterloo, Water Tower.

See Appendix D for definitions of the elements in this table.

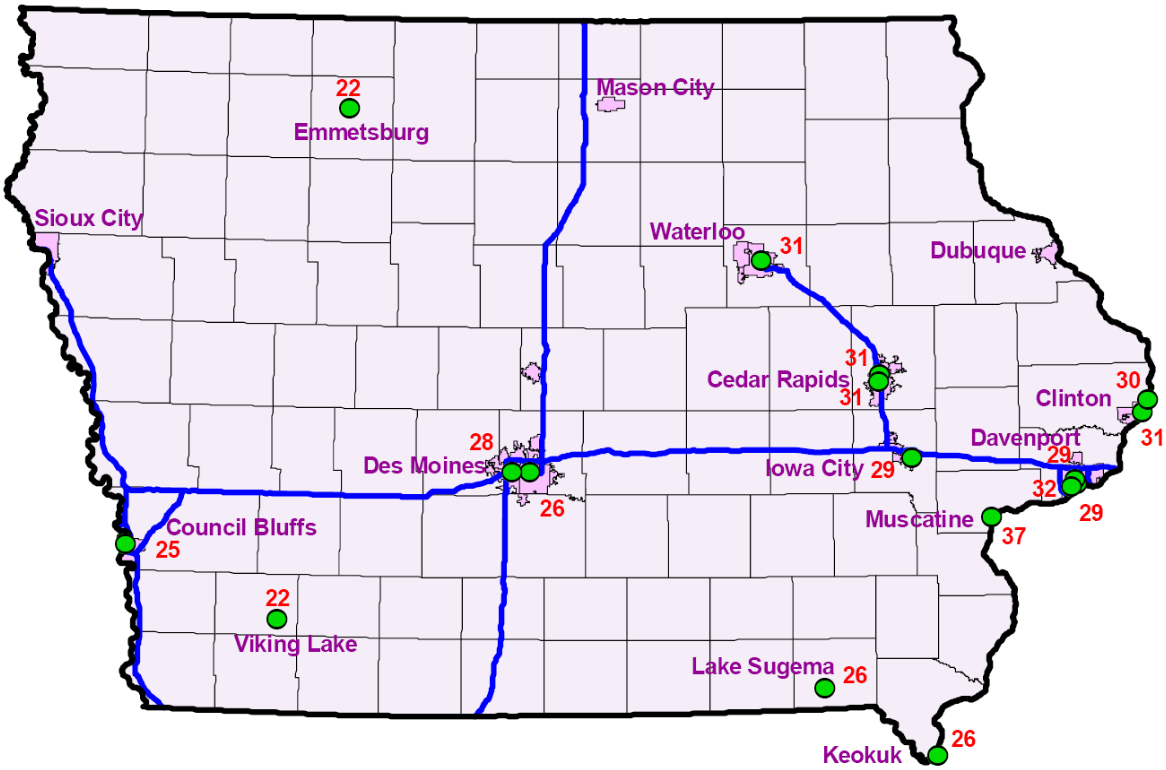
Additional Changes

The changes proposed for sites outside of the Cedar Rapids and Waterloo MSA's are indicated below:

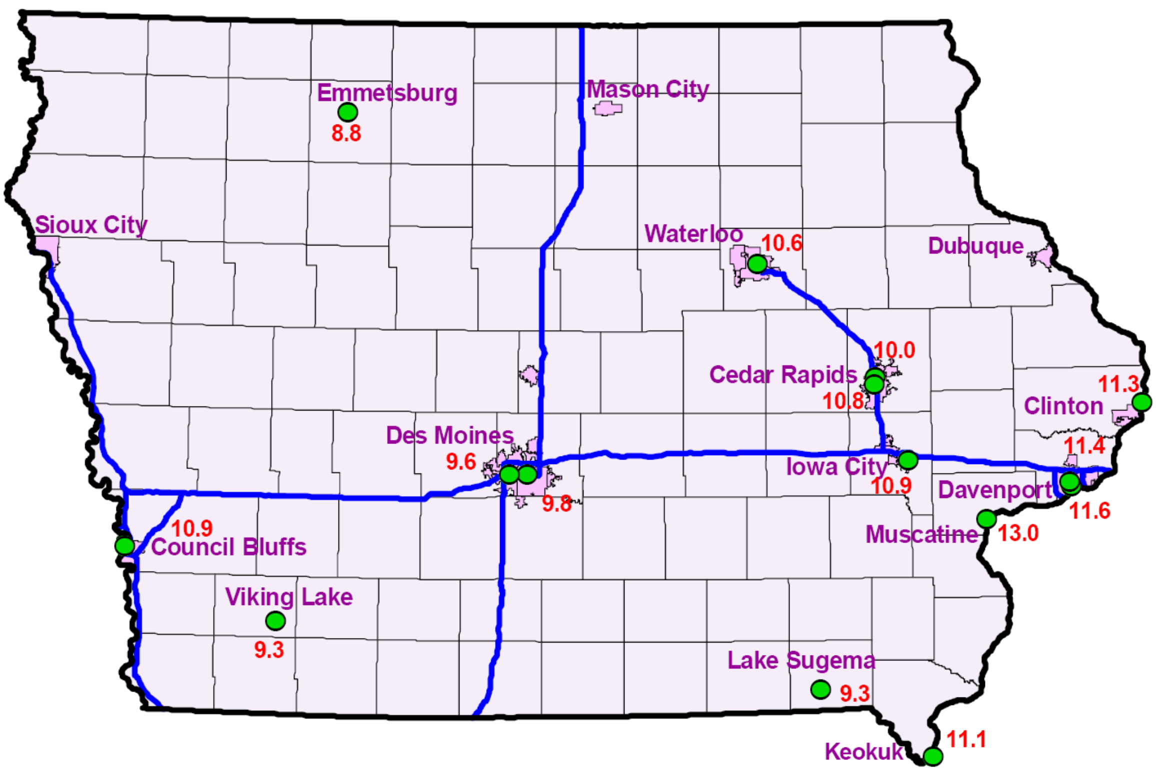
Site Name	Pollutant	Monitor Type	Sampling Method	Analysis	NAAQS Comparable?	Operating Schedule	Action
Sioux City, New site	SO2	SLAMS	UV Fluorescent		Yes	Continuous	Addition
Muscatine, Greenwood Cemetary	SO2	SPM	UV Fluorescent		Yes	Continuous	Addition
Davenport, Jefferson School	SO4	SPM	UV Fluorescent		No	Continuous	Deletion
Davenport, Jefferson School	Pb	SPM	High Volume FRM	GFAA or ICP-MS	No	1/6 Day	Deletion
Backbone State Park	PM10	SPM	Low Volume FRM	Gravimetric	Yes	1/3 day	Addition
Keosauqua, Lake Sugema	NO2	SPM	Chemiluminescence		Yes	Continuous	Addition

See Appendix D for definitions of the elements in this table.

Appendix J: Design Value Maps for $PM_{2.5}$



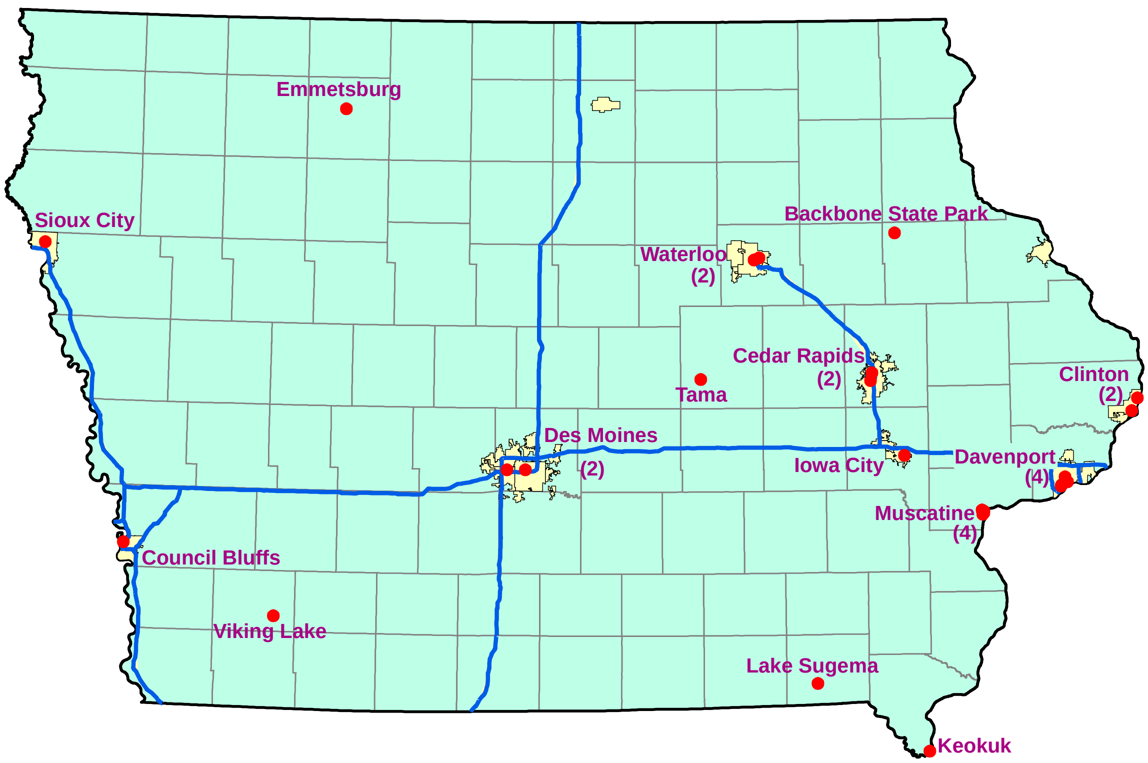
2008-2010 $PM_{2.5}$ 24-hr Design Values ($\mu g/m^3$)



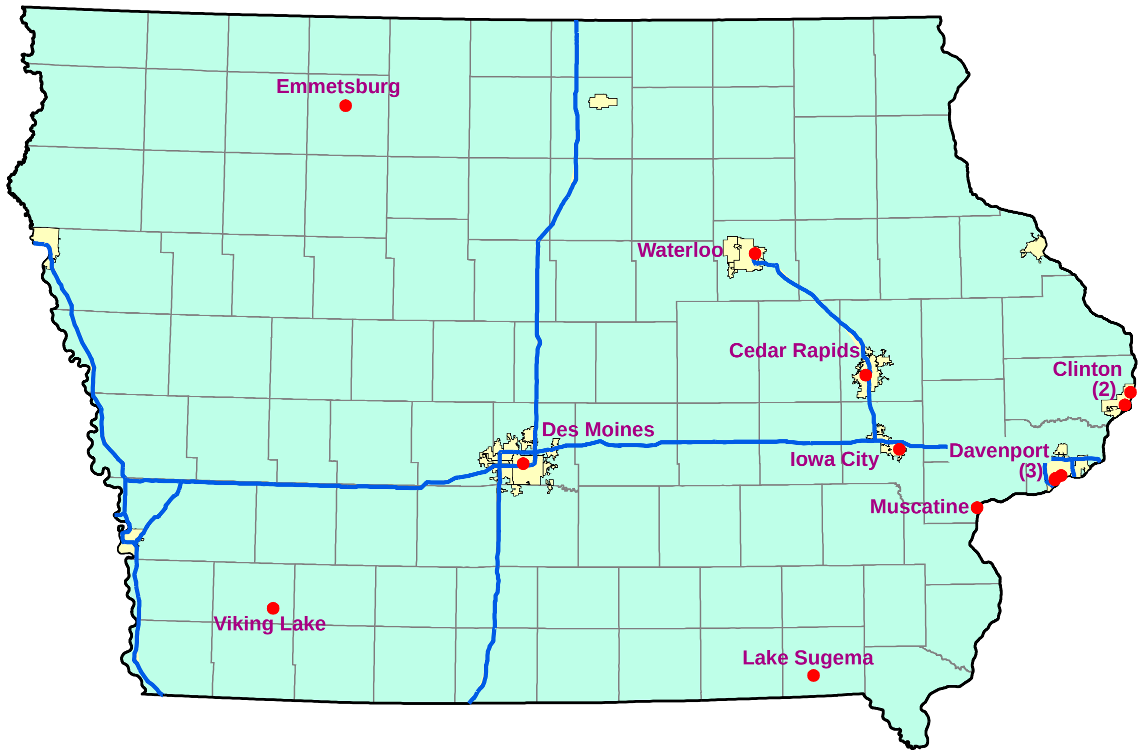
2008-2010 $PM_{2.5}$ Annual Design Values ($\mu g/m^3$)

Appendix K: Iowa Ambient Air Monitoring Network Maps

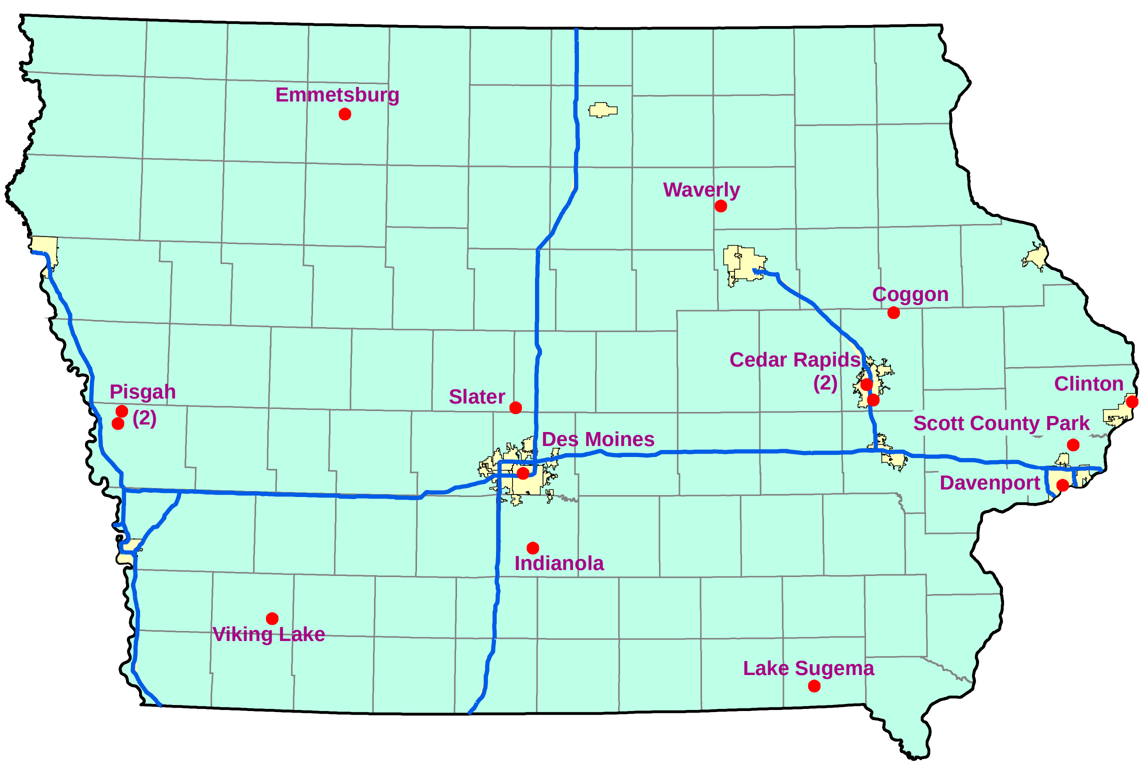
The following maps show the locations for the criteria pollutant monitors in the state of Iowa, which are current as of June 1, 2011. Non-criteria pollutant maps are also included for the continuous $PM_{2.5}$ monitoring network and the Toxics and Speciation monitoring networks.



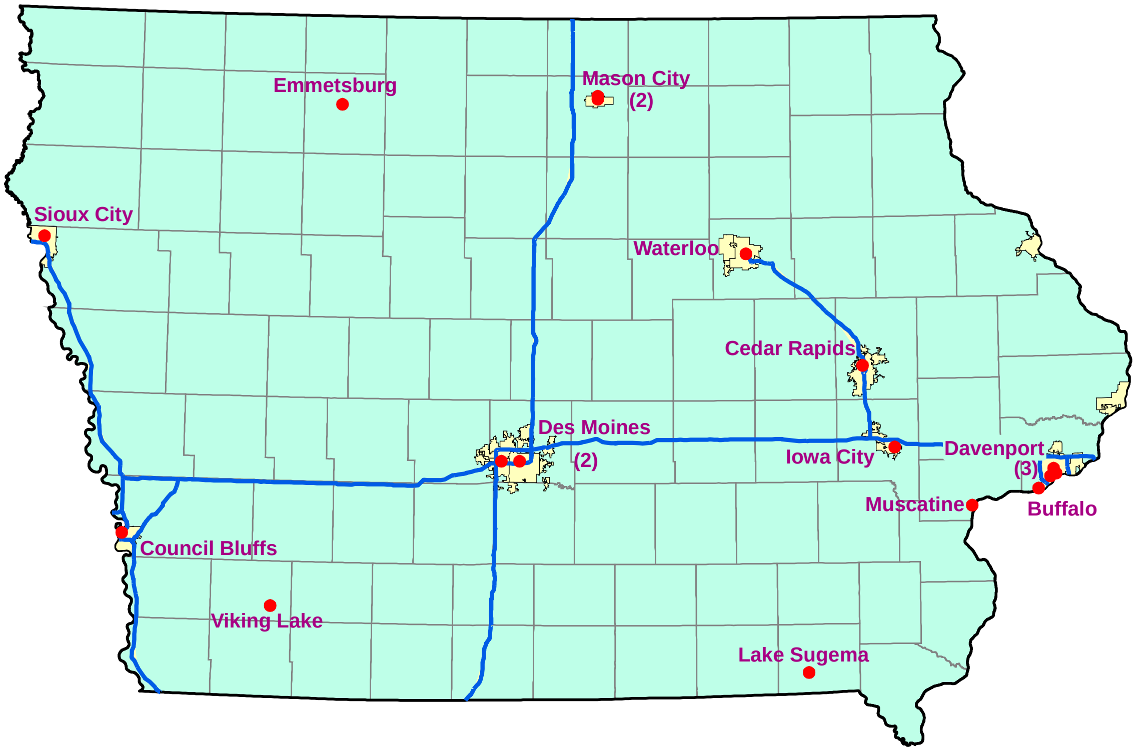
Manual $PM_{2.5}$ (FRM) Monitoring Sites



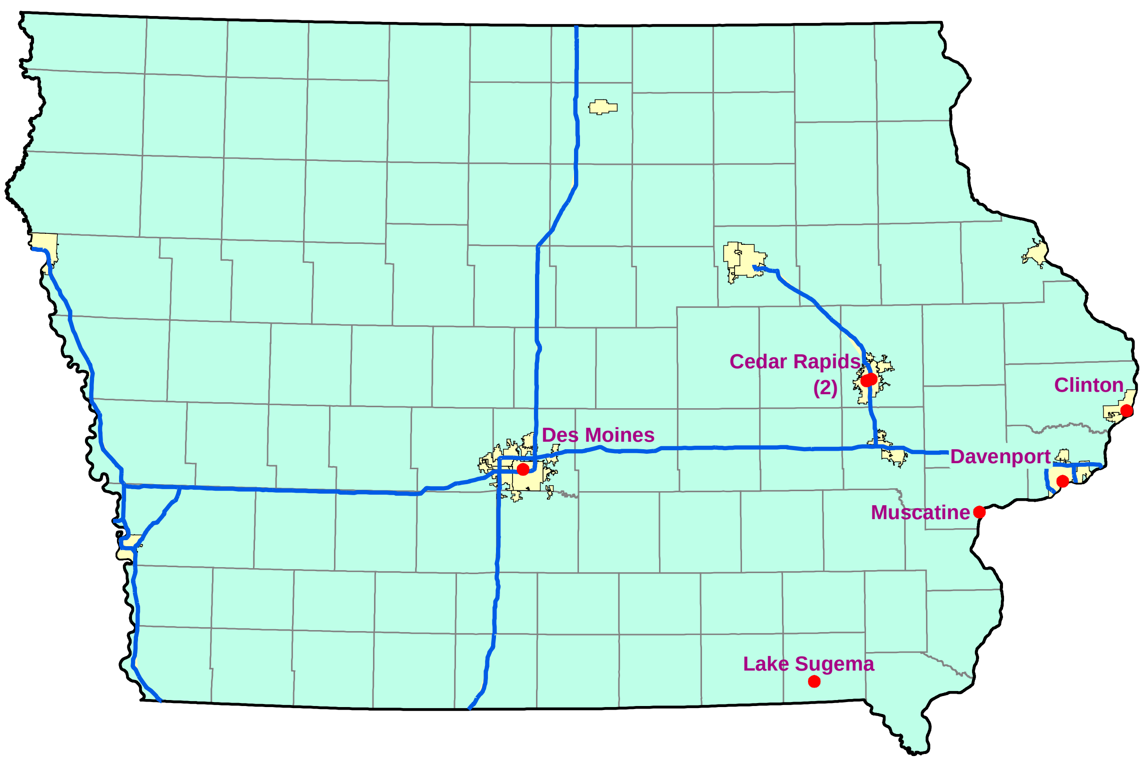
Continuous $PM_{2.5}$ (non-FRM) Monitoring Sites



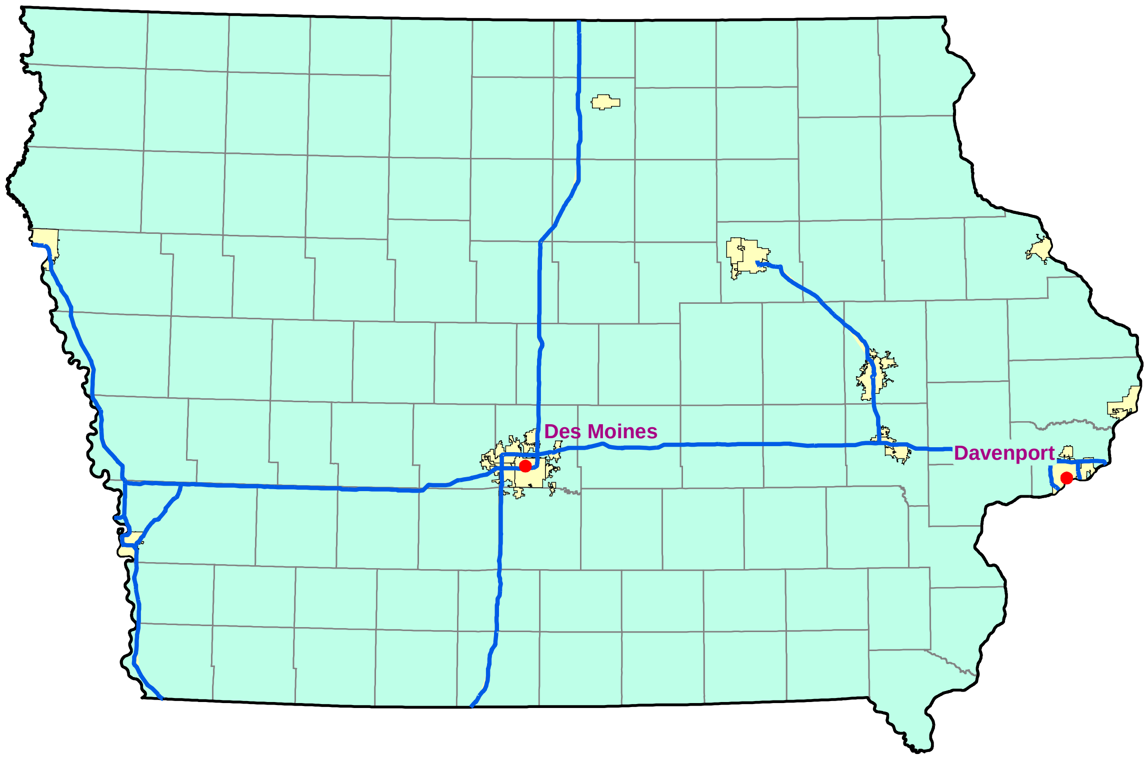
Ozone Monitoring Sites



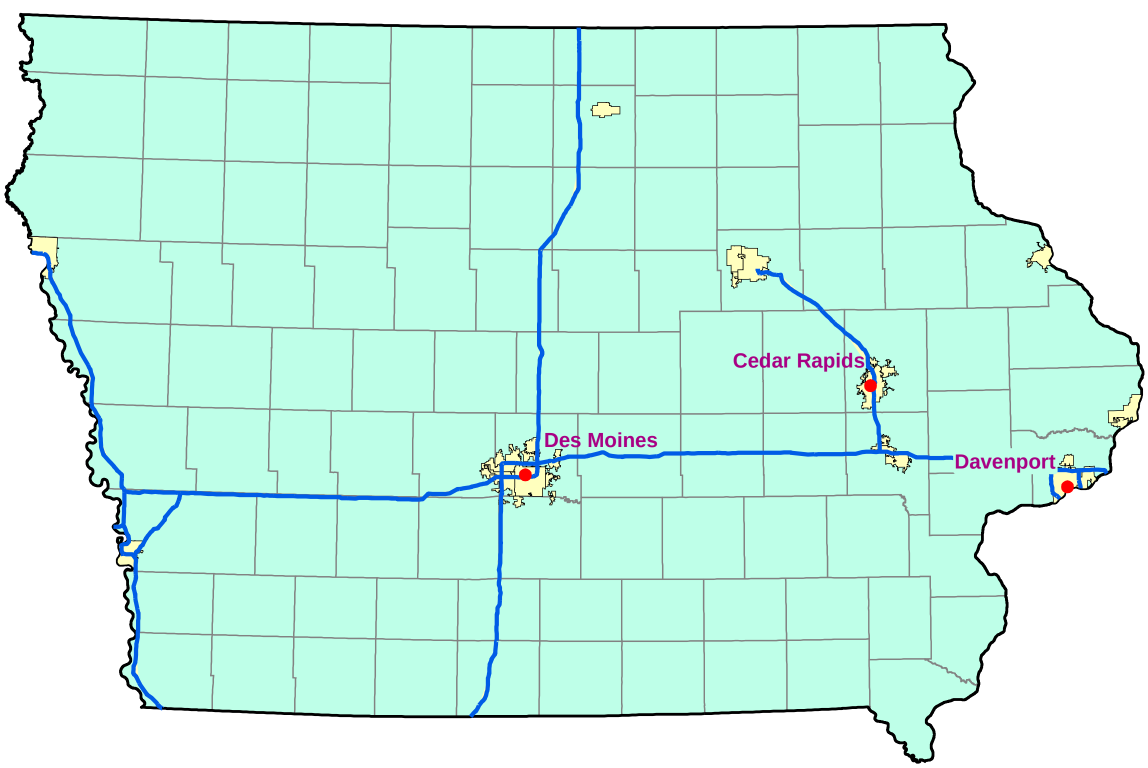
PM_{10} Monitoring Sites



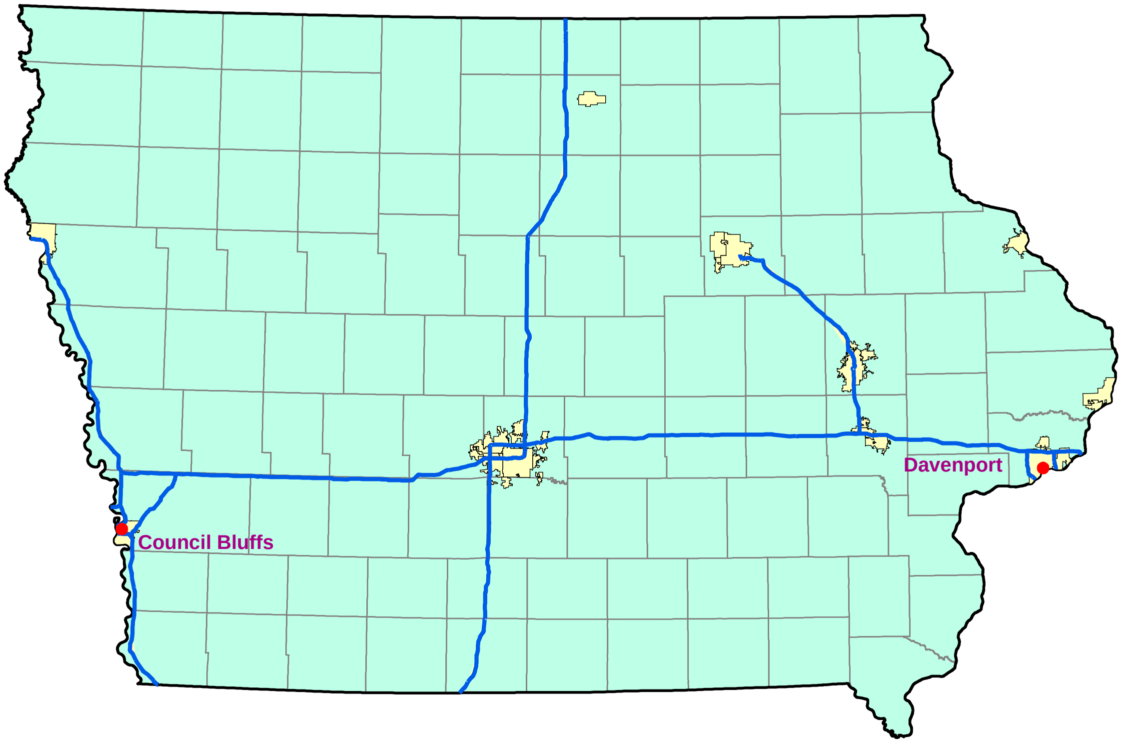
SO_2 Monitoring Sites



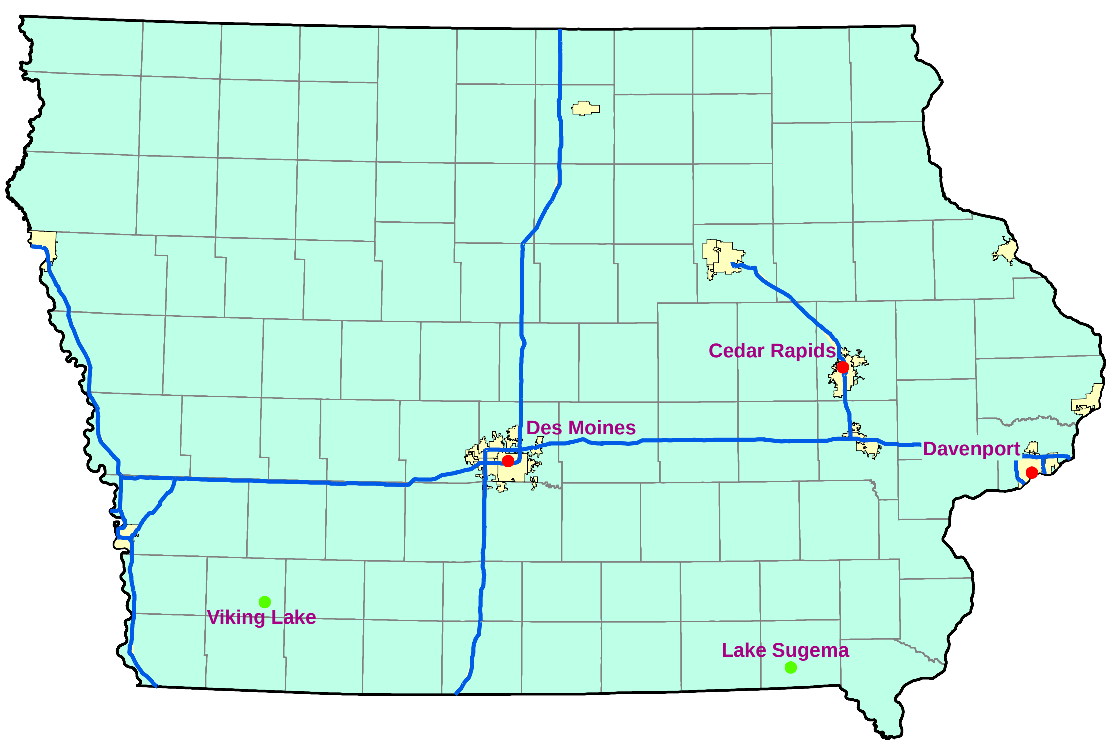
NO_2 Monitoring Sites



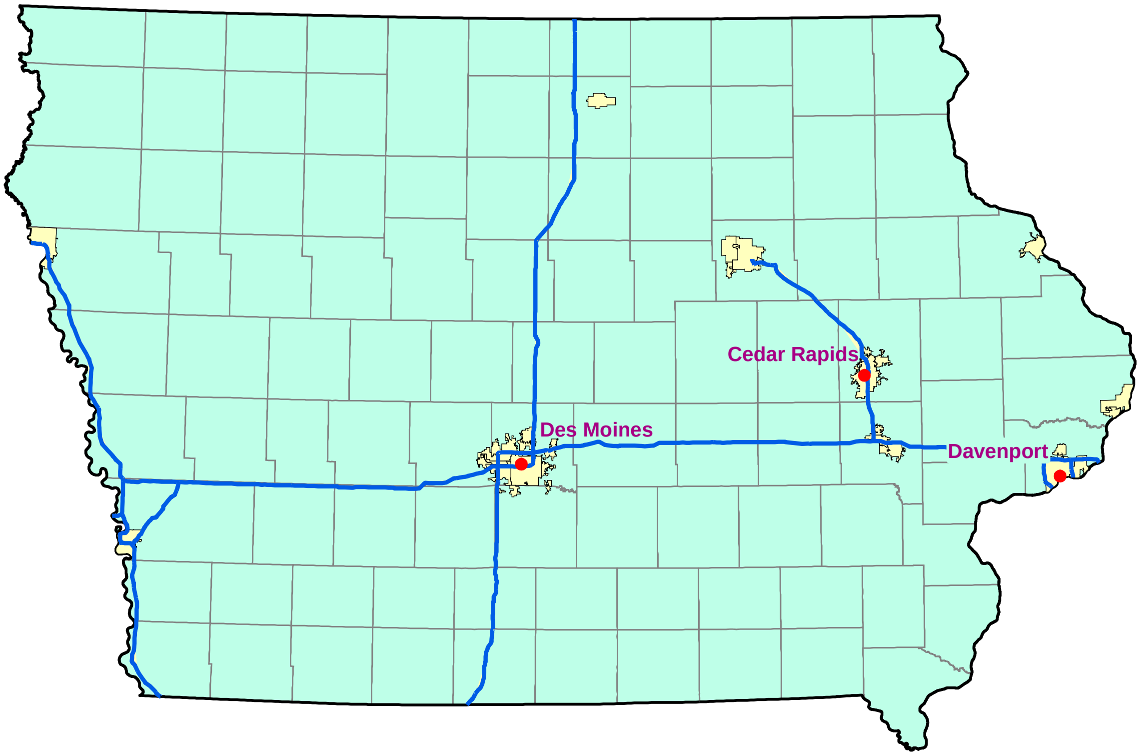
CO Monitoring Sites



Lead (Pb) Monitoring Sites



Speciation Monitors; CSN Speciation samplers are located at the red dots, IMPROVE speciation samplers are located at the green dots.



Toxics Monitoring Sites

Appendix L: Highest PM_{10} Values in Iowa MSA's 2008-2010

The following table shows the highest values recorded by PM_{10} monitors in Iowa Metropolitan Statistical Areas, including those shared with Illinois, South Dakota and Nebraska.

Table D-4 of Appendix D to Part 58 of the Code of Federal Regulations, specifies different minimum monitoring requirements for PM_{10}, depending on whether the concentrations are high, medium, or low. High concentrations are defined as exceeding the PM_{10} NAAQS by 20% or more (186 $\mu g/m^3$ or greater). Medium levels are defined as concentrations exceeding 80% of the NAAQS (between 124 and 186 $\mu g/m^3$). If ambient concentrations are less than 80% of the PM_{10} NAAQS, the levels are characterized as low. These categories are reflected in the last column of the following table.

MSA	2008 Max ($\mu g/m^3$)	2009 Max ($\mu g/m^3$)	2010 Max ($\mu g/m^3$)	3 Year Max ($\mu g/m^3$)	High, Medium, Low Classification
Omaha-Council Bluffs, NE-IA	143	140	306	306	High
Des Moines-West Des Moines, IA	46	53	58	58	Low
Davenport-Moline-Rock Island, IA-IL	116	119	132	132	Medium
Cedar Rapids, IA	50	54	69	69	Low
Waterloo-Cedar Falls, IA	57	54	84	84	Low
Sioux City, IA-NE-SD	96	82	102	102	Low

PM_{10} Values in MSA's (3 year maximum)

Appendix M: Federal Requirements for NCore Sites

40 CFR Part 58 Appendix D, Section 3: Design Criteria for NCore Sites.

(a) Each State (i.e. the fifty States, District of Columbia, Puerto Rico, and the Virgin Islands) is required to operate at least one NCore site. States may delegate this requirement to a local agency. States with many MSAs often also have multiple air sheds with unique characteristics and, often, elevated air pollution. These States include, at a minimum, California, Florida, Illinois, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas. These States are required to identify one to two additional NCore sites in order to account for their unique situations. These additional sites shall be located to avoid proximity to large emission sources. Any State or local agency can propose additional candidate NCore sites or modifications to these requirements for approval by the Administrator. The NCore locations should be leveraged with other multi-pollutant air monitoring sites including PAMS sites, National Air Toxics Trends Stations (NATTS) sites, CASTNET sites, and STN sites. Site leveraging includes using the same monitoring platform and equipment to meet the objectives of the variety of programs where possible and advantageous.

(b) The NCore sites must measure, at a minimum, $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10–2.5}$ particle mass, speciated $PM_{10–2.5}$, O_3, SO_2, CO, NO/NOy, wind speed, wind direction, relative humidity, and ambient temperature.

(1) Although the measurement of NOy is required in support of a number of monitoring objectives, available commercial instruments may indicate little difference in their measurement of NOy compared to the conventional measurement of NOx, particularly in areas with relatively fresh sources of nitrogen emissions. Therefore, in areas with negligible expected difference between NOy and NOx measured concentrations, the Administrator may allow for waivers that permit NOx monitoring to be substituted for the required NOy monitoring at applicable NCore sites.

(2) EPA recognizes that, in some cases, the physical location of the NCore site may not be suitable for representative meteorological measurements due to the site's physical surroundings. It is also possible that nearby meteorological measurements may be able to fulfill this data need. In these cases, the requirement for meteorological monitoring can be waived by the Administrator.

(c) In addition to the continuous measurements listed above, 10 of the NCore locations must also measure lead (Pb) either at the same sites or elsewhere within the MSA/CSA boundary. These ten Pb sites are included within the NCore networks because they are intended to be long-term in operation, and not impacted directly from a single Pb source. These locations for Pb monitoring must be located in the most populated MSA/CSA in each of the 10 EPA Regions. Alternatively, it is also acceptable to use the Pb concentration data provided at urban air toxics sites. In approving any substitutions, the Administrator must consider whether these alternative sites are suitable for collecting long-term lead trends data for the broader area.

(d) Siting criteria are provided for urban and rural locations. Sites with significant historical records that do not meet siting criteria may be approved as NCore by the Administrator. Sites with the suite of NCore measurements that are explicitly designed for other monitoring objectives are exempt from these siting criteria (e.g., a near-roadway site).

(1) Urban NCore stations are to be generally located at urban or neighborhood scale to provide representative concentrations of exposure expected throughout the metropolitan area; however, a middle-scale site may be acceptable in cases where the site can represent many such locations throughout a metropolitan area.

(2) Rural NCore stations are to be located to the maximum extent practicable at a regional or larger scale away from any large local emission source, so that they represent ambient concentrations over an extensive area.

Appendix N: Federal Requirements for Lead Sites

40 CFR Part 58 Appendix D —Network Design Criteria for Ambient Air Quality Monitoring

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3. * * *

(b) The NCore sites must measure, at a minimum, PM2.5 particle mass using continuous and integrated/filter-based samplers, speciated PM2.5, PM10–2.5 particle mass, speciated PM10–2.5, O3, SO2, CO, NO/NOy, wind speed, wind direction, relative humidity, and ambient temperature. NCore sites in CBSA with a population of 500,000 people (as determined in the latest Census) or greater shall also measure Pb either as Pb-TSP or Pb- PM10. The EPA Regional Administrator may approve an alternative location for the Pb measurement where the alternative location would be more appropriate for logistical reasons and the measurement would provide data on typical Pb concentrations in the CBSA.

* * * * *

(c) [Reserved.]

* * * * *

4.5 * * * (a) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near Pb sources which are expected to or have been shown to contribute to a maximum Pb concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory (http://www.epa.gov/ttn/chief/eiinformation.html) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure. (i) One monitor may be used to meet the requirement in paragraph 4.5(a) for all sources involved when the location of the maximum Pb concentration due to one Pb source is expected to also be impacted by Pb emissions from a nearby source (or multiple sources). This monitor must be sited, taking into account logistics and the potential for population exposure, where the Pb concentration from all sources combined is expected to be at its maximum.

(ii) The Regional Administrator may waive the requirement in paragraph 4.5(a) for monitoring near Pb sources if the State or, where appropriate, local agency can demonstrate the Pb source will not contribute to a maximum Pb concentration in ambient air in excess of 50 percent of the NAAQS (based on historical monitoring data, modeling, or other means). The waiver must be renewed once every 5 years as part of the network assessment required under §58.10(d).

(iii) State and, where appropriate, local agencies are required to conduct ambient air Pb monitoring near each of the airports listed in Table D-3A for a period of 12 consecutive months commencing no later than [insert date 12 months after date of publication in the Federal Register]. Monitors shall be sited to measure the maximum Pb concentration in ambient air, taking into account logistics and the potential for population exposure, and shall use an approved Pb-TSP Federal Reference Method or Federal Equivalent Method. Any monitor that exceeds 50 percent of the Pb NAAQS on a rolling 3-month average (as determined according to 40 CFR part 50, Appendix R) shall become a required monitor under paragraph 4.5(c) of this Appendix, and shall continue to monitor for Pb unless a waiver is granted allowing it to stop operating as allowed by the provisions in paragraph 4.5(a)(ii) of this appendix. Data collected shall be submitted to the Air Quality System database according to the requirements of 40 CFR part 58.16.

Table D-3A Airports to be Monitored for Lead

Airport	County	State
Merrill Field	Anchorage	AK
Pryor Field Regional	Limestone	AL
Palo Alto Airport of Santa Clara County	Santa Clara	CA
McClellan-Palomar	San Diego	CA
Reid-Hillview	Santa Clara	CA
Gillespie Field	San Diego	CA
San Carlos	San Mateo	CA
Nantucket Memorial	Nantucket	MA
Oakland County International	Oakland	MI
Republic	Suffolk	NY
Brookhaven	Suffolk	NY
Stinson Municipal	Bexar	TX
Northwest Regional	Denton	TX
Harvey Field	Snohomish	WA
Auburn Municipal	King	WA

(b) State and, where appropriate, local agencies are required to conduct non-source-oriented Pb monitoring at each NCore site required under paragraph 3 of this appendix in a CBSA with a population of 500,000 or more.

(c) The EPA Regional Administrator may require additional monitoring beyond the minimum monitoring requirements contained in paragraphs 4.5(a) and 4.5(b) where the likelihood of Pb air quality violations is significant or where the emissions density, topography, or population locations are complex and varied. EPA Regional Administrators may require additional monitoring at locations including, but not limited to, those near existing additional industrial sources of Pb, recently closed industrial sources of Pb, airports where piston-engine aircraft emit Pb, and other sources of re-entrained Pb dust.

* * * * *

Appendix O: Federal Requirements for SO_2 Sites

40 CFR Part 58 Appendix D —Network Design Criteria for Ambient Air Quality Monitoring

4.4 Sulfur Dioxide (SO2) Design Criteria.
4.4.1 *General Requirements.* (a) State and, where appropriate, local agencies must operate a minimum number of required SO2 monitoring sites as described below.
4.4.2 *Requirement for Monitoring by the Population Weighted Emissions Index.* (a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO2 monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO2 in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of two SO2 monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 5,000, but less than 100,000, a minimum of one SO2 monitor is required within that CBSA.
(1) The SO2 monitoring site(s) required as a result of the calculated PWEI in each CBSA shall satisfy minimum monitoring requirements if the monitor is sited within the boundaries of the parent CBSA and is one of the following site types (as defined in section 1.1.1 of this appendix): population exposure, highest concentration, source impacts, general background, or regional transport. SO2 monitors at NCore stations may satisfy minimum monitoring requirements if that monitor is located within a CBSA with minimally required monitors under this part. Any monitor that is sited outside of a CBSA with minimum monitoring requirements to assess the highest concentration resulting from the impact of significant sources or source categories existing within that CBSA shall be allowed to count towards minimum monitoring requirements for that CBSA.
4.4.3 *Regional Administrator Required Monitoring.* (a) The Regional Administrator may require additional SO2 monitoring stations above the minimum number of monitors required in 4.4.2 of this part, where the minimum monitoring requirements are not sufficient to meet monitoring objectives. The Regional Administrator may require, at his/her discretion, additional monitors in situations where an area has the potential to have concentrations that may violate or contribute to the violation of the NAAQS, in areas impacted by sources which are not conducive to modeling, or in locations with susceptible and vulnerable populations, which are not monitored under the minimum monitoring provisions described above. The Regional Administrator and the responsible State or local air monitoring agency shall work together to design and/or maintain the most appropriate SO2 network to provide sufficient data to meet monitoring objectives.
4.4.4 SO2 *Monitoring Spatial Scales.* (a) The appropriate spatial scales for SO2 SLAMS monitors are the microscale, middle, neighborhood, and urban scales. Monitors sited at the microscale, middle, and neighborhood scales are suitable for determining maximum hourly concentrations for SO2. Monitors sited at urban scales are useful for identifying SO2 transport, trends, and, if sited upwind of local sources, background concentrations.
(1) *Microscale*—This scale would typify areas in close proximity to SO2 point and area sources. Emissions from stationary point and area sources, and non-road sources may, under certain plume conditions, result in high ground level concentrations at the microscale. The microscale typically represents an area impacted by the plume with dimensions extending up to approximately 100 meters.
(2) *Middle scale*—This scale generally represents air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. The middle scale may include locations of expected maximum short-term concentrations due to proximity to major SO2 point, area, and/or non-road sources.
(3) *Neighborhood scale*—The neighborhood scale would characterize air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Emissions from stationary point and area sources may, under certain plume conditions, result in high SO2 concentrations at the neighborhood scale. Where a neighborhood site is located away from immediate SO2 sources, the site may be

useful in representing typical air quality values for a larger residential area, and therefore suitable for population exposure and trends analyses.

(4) *Urban scale*—Measurements in this scale would be used to estimate concentrations over large portions of an urban area with dimensions from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies. Urban scale sites may also support other monitoring objectives of the SO2 monitoring network such as identifying trends, and when monitors are sited upwind of local sources, background concentrations.

4.4.5 *NCore Monitoring.* (a) SO2 measurements are included within the NCore multipollutant site requirements as described in paragraph (3)(b) of this appendix. NCore based SO2 measurements are primarily used to characterize SO2 trends and assist in understanding SO2 transport across representative areas in urban or rural locations and are also used for comparison with the SO2 NAAQS. SO2 monitors at NCore sites that exist in CBSAs with minimum monitoring requirements per section 4.4.2 above shall be allowed to count towards those minimum monitoring requirements.

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Appendix P: Federal Requirements for NO_2 Sites

Appendix D to Part 58—Network Design Criteria for Ambient Air Quality Monitoring
* * * * *

4.3 Nitrogen Dioxide (NO2) Design Criteria

4.3.1 General Requirements

(a) State and, where appropriate, local agencies must operate a minimum number of required NO2 monitoring sites as described below.

4.3.2 Requirement for Near-road NO2 Monitors

(a) Within the NO2 network, there must be one microscale near-road NO2 monitoring station in each CBSA with a population of 500,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO2 monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 500,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures.

(1) The near-road NO2 monitoring stations shall be selected by ranking all road segments within a CBSA by AADT and then identifying a location or locations adjacent to those highest ranked road segments, considering fleet mix, roadway design, congestion patterns, terrain, and meteorology, where maximum hourly NO2 concentrations are expected to occur and siting criteria can be met in accordance with appendix E of this part. Where a State or local air monitoring agency identifies multiple acceptable candidate sites where maximum hourly NO2 concentrations are expected to occur, the monitoring agency shall consider the potential for population exposure in the criteria utilized to select the final site location. Where one CBSA is required to have two near-road NO2 monitoring stations, the sites shall be differentiated from each other by one or more of the following factors: fleet mix; congestion patterns; terrain; geographic area within the CBSA; or different route, interstate, or freeway designation.

(b) Measurements at required near-road NO2 monitor sites utilizing chemiluminescence FRMs must include at a minimum: NO, NO2, and NOX.

4.3.3 Requirement for Area-wide NO2 Monitoring

(a) Within the NO2 network, there must be one monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected highest NO2 concentrations representing the neighborhood or larger spatial scales. PAMS sites collecting NO2 data that are situated in an area of expected high NO2 concentrations at the neighborhood or larger spatial scale may be used to satisfy this minimum monitoring requirement when the NO2 monitor is operated year round. Emission inventories and meteorological analysis should be used to identify the appropriate locations within a CBSA for locating required area-wide NO2 monitoring stations. CBSA populations shall be based on the latest available census figures.

4.3.4 Regional Administrator Required Monitoring

(a) The Regional Administrators, in collaboration with States, must require a minimum of forty additional NO2 monitoring stations nationwide in any area, inside or outside of CBSAs, above the minimum monitoring requirements, with a primary focus on siting these monitors in locations to protect susceptible and vulnerable populations. The Regional Administrators, working with States, may also consider additional factors described in paragraph (b) below to require monitors beyond the minimum network requirement.

(b) The Regional Administrators may require monitors to be sited inside or outside of CBSAs in which:

(i) The required near-road monitors do not represent all locations of expected maximum hourly NO2 concentrations in an area and NO2 concentrations may be approaching or exceeding the NAAQS in that area;

(ii) Areas that are not required to have a monitor in accordance with the monitoring requirements and NO2 concentrations may be approaching or exceeding the NAAQS; or

(iii) The minimum monitoring requirements for area-wide monitors are not sufficient to meet monitoring objectives.

(c) The Regional Administrator and the responsible State or local air monitoring agency should work together to design and/ or maintain the most appropriate NO2 network to address the data needs for an area, and include all monitors under this provision in the annual monitoring network plan.

4.3.5 NO_2 Monitoring Spatial Scales

(a) The most important spatial scale for near-road NO_2 monitoring stations to effectively characterize the maximum expected hourly NO_2 concentration due to mobile source emissions on major roadways is the microscale. The most important spatial scales for other monitoring stations characterizing maximum expected hourly NO_2 concentrations are the microscale and middle scale. The most important spatial scale for area-wide monitoring of high NO_2 concentrations is the neighborhood scale.

(1) *Microscale*—This scale represents areas in close proximity to major roadways or point and area sources. Emissions from roadways result in high ground level NO_2 concentrations at the microscale, where concentration gradients generally exhibit a marked decrease with increasing downwind distance from major roads. As noted in appendix E of this part, near-road NO_2 monitoring stations are required to be within 50 meters of target road segments in order to measure expected peak concentrations. Emissions from stationary point and area sources, and non-road sources may, under certain plume conditions, result in high ground level concentrations at the microscale. The microscale typically represents an area impacted by the plume with dimensions extending up to approximately 100 meters.

(2) *Middle scale*—This scale generally represents air quality levels in areas up to several city blocks in size with dimensions on the order of approximately 100 meters to 500 meters. The middle scale may include locations of expected maximum hourly concentrations due to proximity to major NO_2 point, area, and/or non-road sources.

(3) *Neighborhood scale*—The neighborhood scale represents air quality conditions throughout some relatively uniform land use areas with dimensions in the 0.5 to 4.0 kilometer range. Emissions from stationary point and area sources may, under certain plume conditions, result in high NO_2 concentrations at the neighborhood scale. Where a neighborhood site is located away from immediate NO_2 sources, the site may be useful in representing typical air quality values for a larger residential area, and therefore suitable for population exposure and trends analyses.

(4) *Urban scale*—Measurements in this scale would be used to estimate concentrations over large portions of an urban area with dimensions from 4 to 50 kilometers. Such measurements would be useful for assessing trends in area-wide air quality, and hence, the effectiveness of large scale air pollution control strategies. Urban scale sites may also support other monitoring objectives of the NO_2 monitoring network identified in paragraph 4.3.4 above.

4.3.6 NO_y Monitoring

(a) NO/NO_y measurements are included within the NCore multi-pollutant site requirements and the PAMS program. These NO/NO_y measurements will produce conservative estimates for NO_2 that can be used to ensure tracking continued compliance with the NO_2 NAAQS. NO/NO_y monitors are used at these sites because it is important to collect data on total reactive nitrogen species for understanding O_3 photochemistry.

* * * * *

Appendix Q: Lead (Pb) Emissions Estimates

Facilities with IDNR estimated lead emissions over 0.25 tpy are indicated below:

Facility Name	***2009 NEI (tons)***[1]
Grain Processing Corporation	3.145
Griffin Pipe Products Company	1.437
ADM - Des Moines Soybean	0.441
Walter Scott Jr. Energy Center	0.412
MidAmerican Energy Company - George Neal North	0.385
MidAmerican Energy Company - Louisa Station	0.268

[1]The values in this table represent the IDNR's best estimates of lead emissions. The IDNR will update its original 2009 NEI with these revised estimates as soon as EPA opens the EIS Gateway to allow the revisions.

Two facilities have 2009 lead emissions estimates greater than EPA's 0.5 ton per year monitoring threshold, Grain Processing Corporation and Griffin Pipe Products Company.

Lead emissions from Grain Processing Corporation (GPC) decreased from 3.44 tons in 2008 to 3.145 tons in 2009. The decrease in emissions was due a decrease in the amount of coal combusted at GPC. Dispersion modeling performed for Iowa's 2009 network plan demonstrated ambient impacts less than 5% of the lead NAAQS, using 2008 lead emissions estimates. EPA granted a five year waiver of ambient monitoring requirements based on these results. In 2009, no other change at GPC has occurred that would affect lead emissions or dispersion characteristics, and the IDNR believes EPA's waiver of ambient monitoring requirements for this facility continues to be appropriate.

A lead monitoring site was established near Griffin Pipe Products Corporation in Council Bluffs in the fall of 2009. The 2010 ambient monitoring data from this site indicated non-attainment with the lead NAAQS. Additional emissions control equipment has recently been installed at Griffin Pipe. Dispersion modeling incorporating the latest stack test data from Griffin Pipe predicts the current maximum ambient lead impacts are less than 17% of the NAAQS. (See Appendix R)

IOWA DEPARTMENT OF NATURAL RESOURCES

Environmental Protection Division
Air Quality Bureau
Modeling Group

M E M O R A N D U M

DATE: **5/18/11**

TO: **BRIAN HUTCHINS, SEAN FITZSIMMONS**

FROM: **DON PETERSON**

RE: **GRIFFIN PIPE PRODUCTS COMPANY (78-01-012), COUNCIL BLUFFS, LEAD EMISSIONS MODELING**

CC: **CATHARINE FITZSIMMONS, DAVE PHELPS, JIM MCGRAW, LORI HANSON, JASON MARCEL, CHRIS ROLING, PETER ZAYUDIS, NICK PAGE**

INTRODUCTION

On January 12, 2009, the EPA's more stringent NAAQS standard for airborne lead (Pb) became effective. The primary standard for lead is 0.15 $\mu g/m^3$ based on the maximum (not to be exceeded) 3-month rolling average. Facilities that emit over 1 ton/year of lead are required to monitor for attainment with the standard. Monitoring may, at the EPA Regional Administrator's discretion, be waived if modeled lead concentrations do not exceed 50% of the standard.

The purpose of the current dispersion modeling analysis is to re-evaluate predicted ambient lead concentrations around Griffin Pipe Products Company for aid in developing a lead monitoring plan for the facility for 2011. Pursuant to DNR permit requirements, baghouse controls were installed, and subsequent operation begun in December, 2010, to reduce lead emissions from the cupola (EP2A) and the desulfurization process (EP3). This reduction in lead emissions may result in a redistribution of lead concentration isopleths (contour lines of equal concentration) in the vicinity of Griffin Pipe requiring appropriate relocation of the source-oriented lead monitor.

The modeling template is taken from the modeling done in January-February, 2011 for lead non-attainment designation in the Council Bluffs area. The emission parameters from EP2A and EP3 have been updated based on stack testing conducted in March, 2011. The sensitive areas are taken from the April, 2010 lead modeling project performed to aid in developing a monitoring plan for the facility for 2010.

MODELING SUMMARY

A facility-wide lead NAAQS dispersion modeling analysis was conducted for Griffin Pipe Products Company located in Council Bluffs, Iowa. The DNR evaluated the ambient impacts from two baghouse-controlled sources of airborne lead emissions, EP2A (cupola) and EP3 (desulfurization process). In addition, the model includes emissions from EP7A and EP7B. These represent the potential uncaptured emissions from the desulfurization and magnesium inoculation processes, respectively. Since controls were added to the primary lead sources EP2A and EP3, these uncaptured emissions are now the significant contributors to ambient impacts.[8]

[8] There are several other sources of lead emissions at Griffin Pipe Products that, for completeness, were included in the non-attainment designation modeling performed in Jan-Feb, 2011 but which are not included here. Those lead sources are very small and would not affect the predicted lead concentrations.

This report presents the maximum predicted concentrations for some sensitive locations, such as schools and residences, in the vicinity of Griffin Pipe. In addition, an aerial view of the facility is provided with an overlay of concentration isopleths that allow for a visual representation of the maximum predicted concentrations of airborne lead averaged over time.

MODEL RESULTS

The emission sources for this project were evaluated using the emission rates and stack parameters listed in Table 1. Stack parameter changes based on the March, 2011 stack tests are noted with **bold** typeface.

The lead modeling results for the worst case calendar quarter and year are listed in Table 2. The lead NAAQS requires that ambient concentrations of lead not exceed 0.15 $\mu g/m^3$ based on the maximum 3-month rolling average. According to the results from the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD), the lead emissions from Griffin Pipe Products Company will cause predicted concentrations that are less than the lead NAAQS. The highest lead concentration (computed on a rolling quarter basis) is 0.025 $\mu g/m^3$. The location of the highest concentration is along the south boundary near where the old cupola (EP2) is located.

Results for the identified sensitive locations near the facility are shown in Table 3. It is noted that now, with the lead emissions from EP2A and EP3 controlled, the ambient lead concentrations come primarily from the uncaptured emissions from EP7A and EP7B.

Surface mapping software is used to provide visual displays of the results. Figure 1 shows an aerial view of the Griffin Pipe facility. A visual display of the predicted lead concentration isopleths is provided in Figures 2 and 3.[9] The isopleths are based on the highest 3-month rolling average concentrations at each of the 2408 receptors in the model. Figure 3 provides a detail of the predominant downwind area just north of the plant. It shows the identified sensitive areas, such as schools and residences. These figures indicate the lead concentration distribution is essentially bimodal, reflecting the summer and winter predominant wind directions. The northern lobe indicates that the highest predicted concentration in this area, primarily residential, has moved south closer to the plant's northern boundary. However, the current monitor location remains close to the lobe's maximum, capturing higher predicted concentrations than the other sensitive areas. (Table 3)

The correctness of the parameters used in the modeling, including emission rates, was verified by the Construction Permits Section staff.

[9] Aerial photos for Figures 2 and 3 were taken from Iowa Geographic Map Server.

Table 1: Modeled Emission Rates and Stack Parameters

Emission Points		Stack Parameters				
ID	Description	Pb Emission Rates (lb/hr)	Stack height (ft)	Stack gas exit temp (°F)	Stack gas flow rate (acfm)*	Stack tip diameter (ft)
EP2A	Cupola baghouse	**0.0074**	100	**287**	**87,755**	6.67
EP3	Desulfurization baghouse	**0.0015**	100	**97**	**64,870**	6.17
EP7A	Desulfurization uncaptured	0.008	80	95	119,545	10.2
EP7B	Magnesium inoculation uncaptured	0.008	80	95	119,545	10.2

* Discharge type vertical/unrestricted.

Table 2: Worst Case Modeling Result for Pb for the 2000 – 2004 Meteorological Data Set

Rolling 3-month period for which result occurred	Predicted Concentration* (μg/m^3)	Background Concentration (μg/m^3)	Total Concentration (μg/m^3)	NAAQS (μg/m^3)
January – March / 2003	0.025	0	0.025	0.15

* The rolling 3-month concentration is the highest predicted value. The location of the highest predicted lead concentration is at UTM coordinates 258176 m (easting) and 4570749 m (northing), NAD83. This is on the south fenceline near where the old cupola stack (EP2) is located.

Table 3: Ambient Contributions of Lead Based on Highest Predicted Values at Sensitive Locations

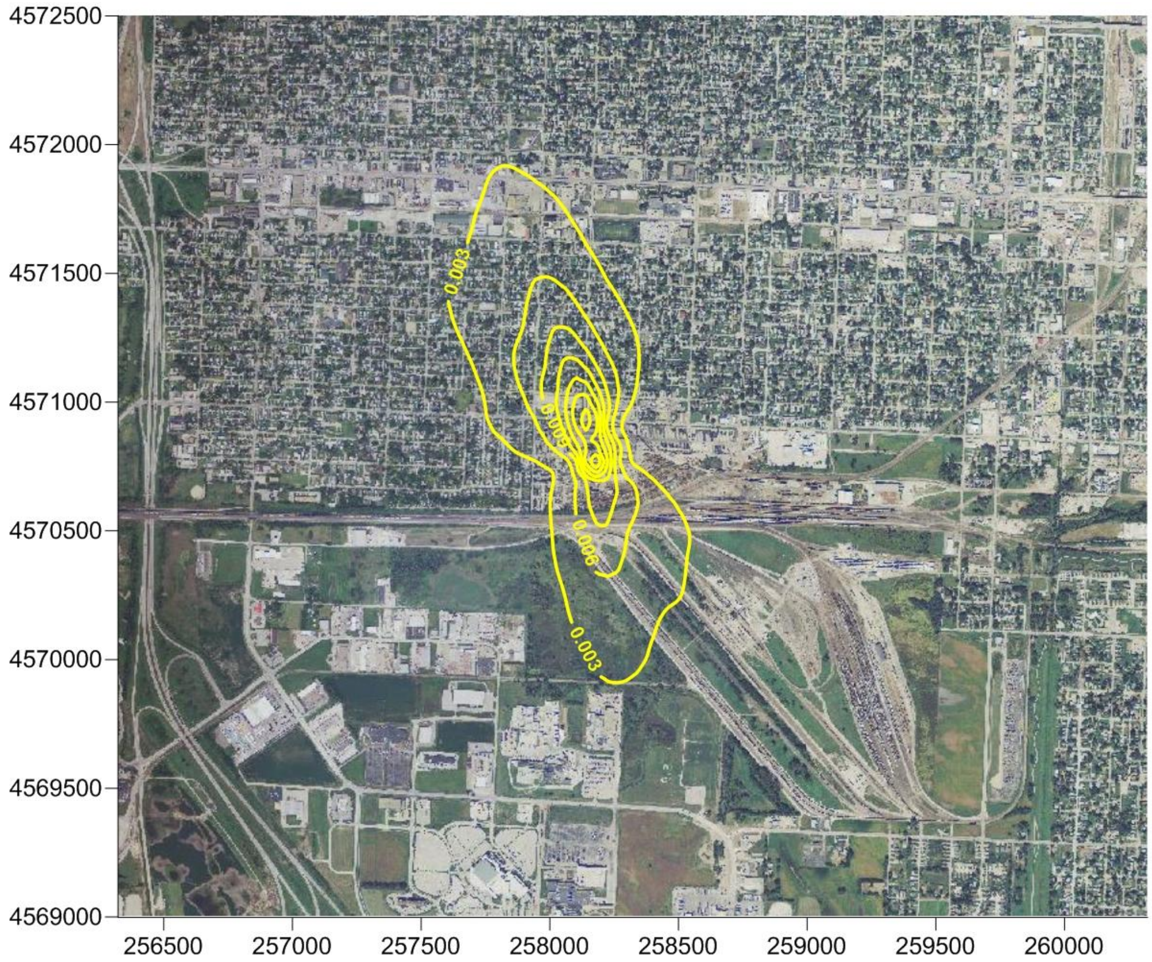
Location	Easting*	Northing*	EP2A Predicted Concentration (μg/m^3)	EP3 Predicted Concentration (μg/m^3)	EP7A Predicted Concentration (μg/m^3)	EP7B Predicted Concentration (μg/m^3)	Total Predicted Concentration (μg/m^3)**
South fence line near stack EP2	258176	4570749	0.000	0.000	0.013	0.011	0.025
Monitor Location	258113	4571008	0.000	0.000	0.010	0.010	0.020
Rue Elementary School	257164	4571318	0.000	0.000	0.000	0.000	0.001
St. Albert Elementary School	257730	4570992	0.000	0.000	0.001	0.001	0.003
Residence 1	258068	4571089	0.000	0.000	0.007	0.007	0.014
Residence 2	258241	4571064	0.000	0.000	0.003	0.004	0.007
Thomas Jefferson HS	258362	4571728	0.000	0.000	0.001	0.001	0.001
Timothy Lutheran Pre-School	257485	4571903	0.000	0.000	0.001	0.001	0.002
Little Hands at Work & Play (Day Care Center)	258140	4571586	0.000	0.000	0.001	0.001	0.003
Edison Elementary School	258910	4571540	0.000	0.000	0.000	0.000	0.000

* NAD 83.
** The total may be slightly different from the sum of the individual contributions, because the highest predicted values do not necessarily occur at the same time.

Figure 1: Aerial view of Griffin Pipe Products Company and some of the adjacent properties (mostly residential) to the north.[10]

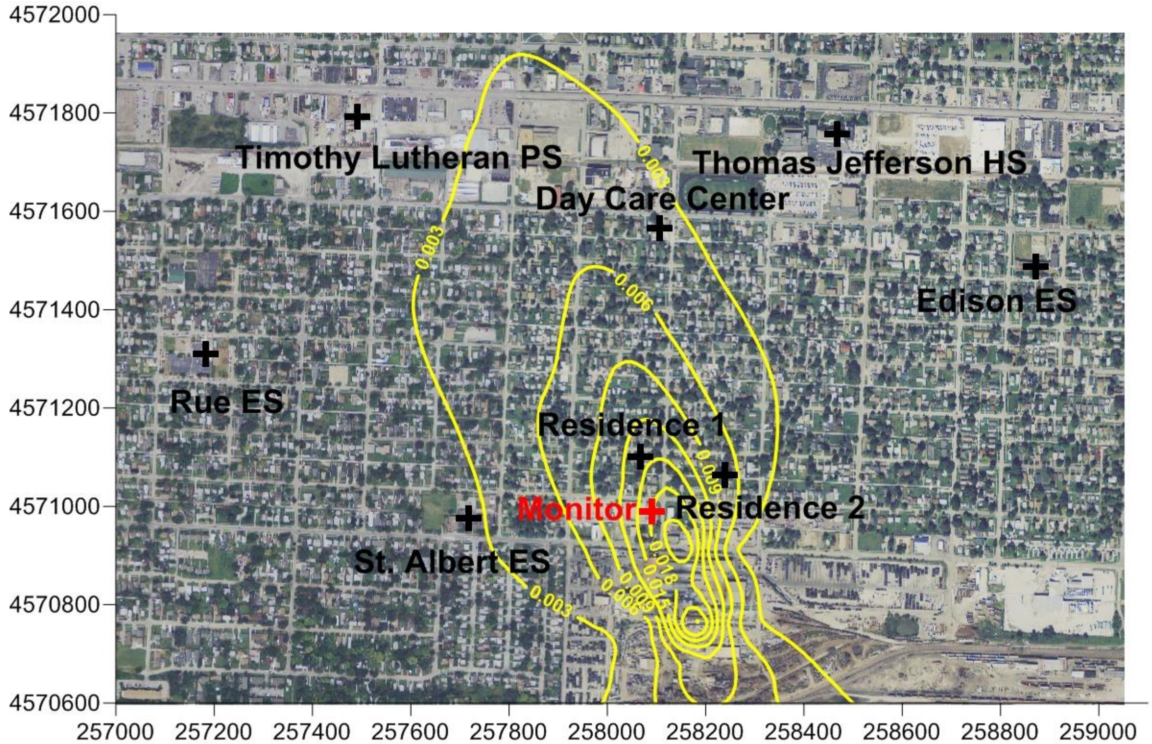
[10] Picture taken from Microsoft Virtual Earth and horizontally compressed to fit on page.

Figure 2: Modeled concentrations due to lead emissions from Griffin Pipe. The location of the highest predicted lead concentration is at UTM coordinates 258176 m (easting) and 4570749 m (northing), NAD83. This is along the south fence line near where the old cupola stack EP2 is located.



contour interval = 0.003 micrograms/cubic meter

Figure 3: Detail of the sensitive areas identified north of Griffin Pipe.



contour interval = 0.003 micrograms/cubic meter

Appendix S: Sulfur Dioxide Population Weighted Emissions Index

The new SO_2 rule requires monitoring in or near Core Based Statistical Areas (CBSA's) based on the population weighted emissions index (PWEI). The PWEI is calculated using the most recent census data or estimates, and the most recent county level emissions data available in the National Emissions Inventory.

The PWEI is calculated by multiplying the population of the CBSA by the total tons of SO_2 emissions inventories from counties that make up the CBSA and dividing by one million. The PWEI is expressed in units of million person-tons per year.

The final monitoring regulations require monitors to be placed in Core Based Statistical Areas (CBSA's) based on the PWEI for the area. The final rule requires:

- 3 monitors in CBSAs with index values of 1,000,000 or more;
- 2 monitors in CBSAs with index values less than 1,000,000 but greater than 100,000; and
- 1 monitor in CBSAs with index values greater than 5,000.

Iowa has chosen to use the 2008 National Emissions Inventory (NEI) data[11] as the most complete and accessible data to use for SO_2 emissions information. U.S. Census Bureau population estimates from Appendix F have been used for population data. The PWEI for Iowa MSA's are listed in the table below.

US Census Geographic Area	US Census Population Estimate, 2010	SO_2 Emissions, tons per year (2008 NEI)	SO_2 Population Weighted Emissions Index
Omaha-Council Bluffs, NE-IA	865,350	59,630	51,601
Sioux City, IA-NE	143,577	35,637	5,117
Davenport-Moline-Rock Island, IA-IL	379,690	7,337	2,786
Cedar Rapids, IA	257,940	8,094	2,088
Des Moines-West Des Moines, IA	569,633	676	385
Ames, IA	89,542	4,296	385
Iowa City, IA	152,586	1,098	167
Waterloo-Cedar Falls, IA	167,819	551	92
Dubuque, IA	93,653	12	1

[11] http://www.epa.gov/ttnchie1/net/2008inventory.html

Appendix T: Supplemental Sulfur Dioxide Modeling Analysis

Impact of Source Groups for the MidAmerican George Neal Power Station

MidAmerican's George Neal Power Station is located south of Sioux City on the Missouri River. There are two facilities comprising the station, George Neal North (GNN) and George Neal South (GNS). GNN is about 12 miles south of Sioux City and GNS is about 2 miles south of GNN. GNN and has three coal fired boilers: Unit 1 (120MW), Unit 2 (300MW) and Unit 3 (505 MW). (See Figure 1) GNS has one coal fired boiler, Unit 4 (644 MW). (See Figure 2) GNN Unit 1 is the oldest of the four units, has a shorter stack than the other boilers, and is located near the center of the GNN complex.

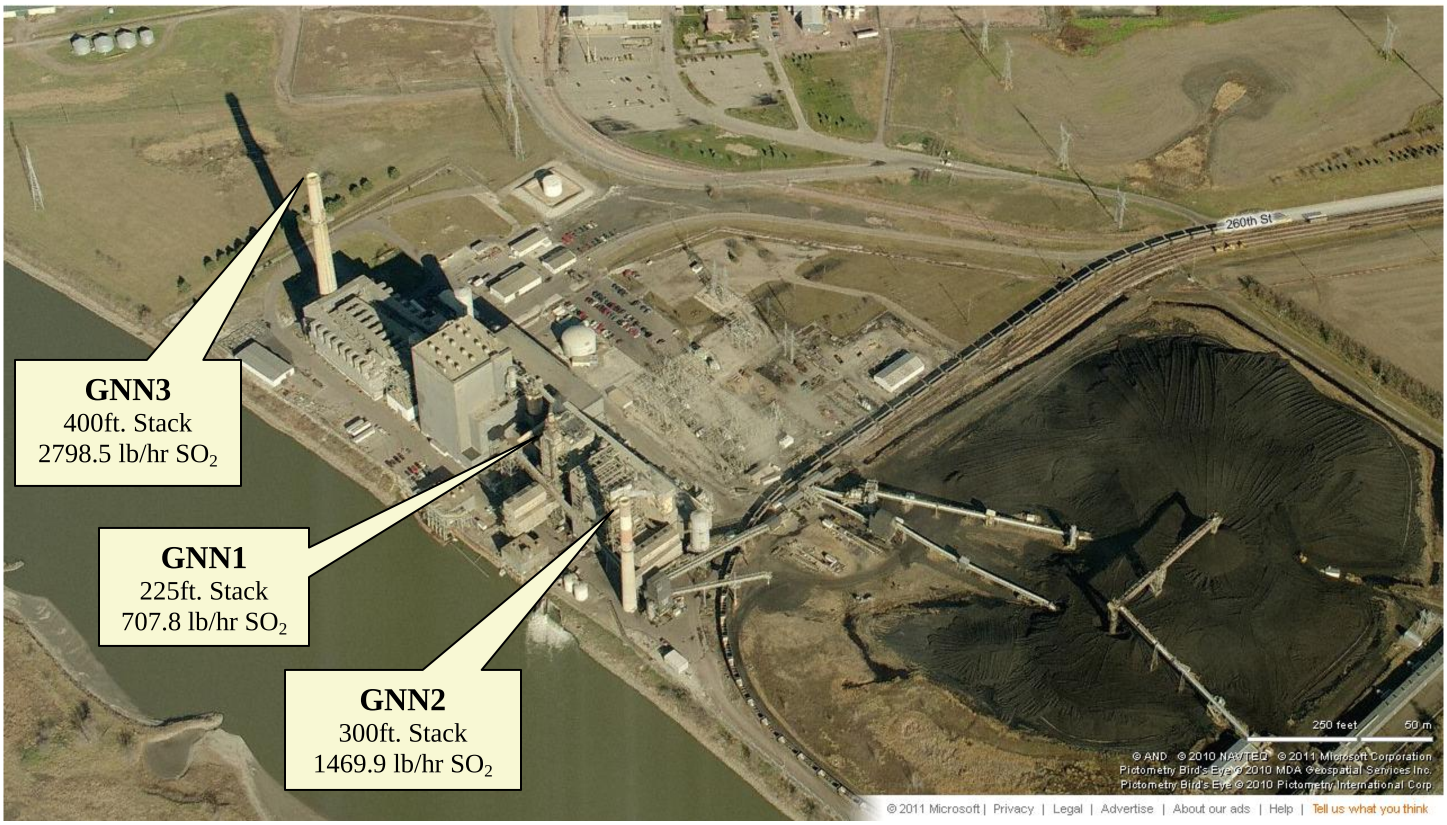


Figure 1. Relative location of SO_2 emission points for the MidAmerican George Neal North facility.

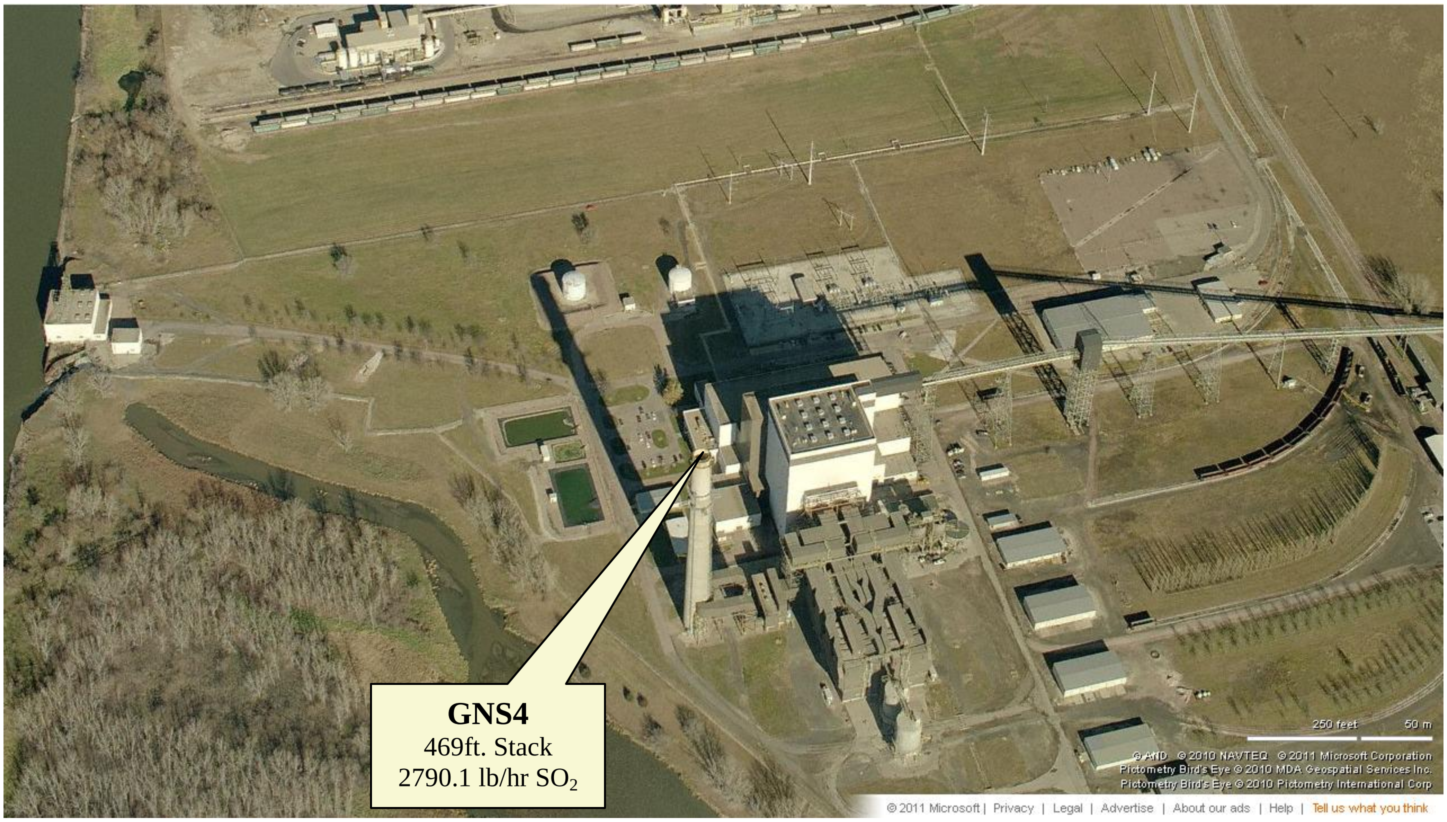


Figure 2. Relative location of SO_2 emission points for the MidAmerican George Neal South facility.

In order to facilitate monitor placement, the IDNR conducted dispersion modeling of the sulfur dioxide emissions from Neal Station. The modeling was performed using historical data; average emission rates were obtained from SO_2 monitors on the boiler stacks. The modeling indicates the areas that are predicted to exceed the NAAQS ("hotspots") are not in heavily populated areas. The largest hotspot lies in agricultural lands to the northwest of GNN, with smaller hotspots close to GNN to the northeast, southwest, and southeast. (See Figure 3 below and Appendix U)

Using a dispersion model, one can shut off the emissions from individual units. If one shuts off the emissions from Unit 1, the large hotspot to the northwest of GNN remains (Compare Figures 3 and 4 below). If one shuts off all units except Unit 1, the hotspots to the northeast and southwest of GNN remain as well as a tiny hotspot southeast of the facility (Compare Figures 3 and 5 below). It is well known that when the wind blows past an obstruction, a low pressure area (vacuum) is created downwind of the obstruction. This phenomenon is known by dispersion modelers as "downwash". The modeling of Neal Station shows that the plume from Unit 1 generates its highest impacts close to GNN, as the emissions from its short stack cannot escape the downwash from the buildings at GNN.

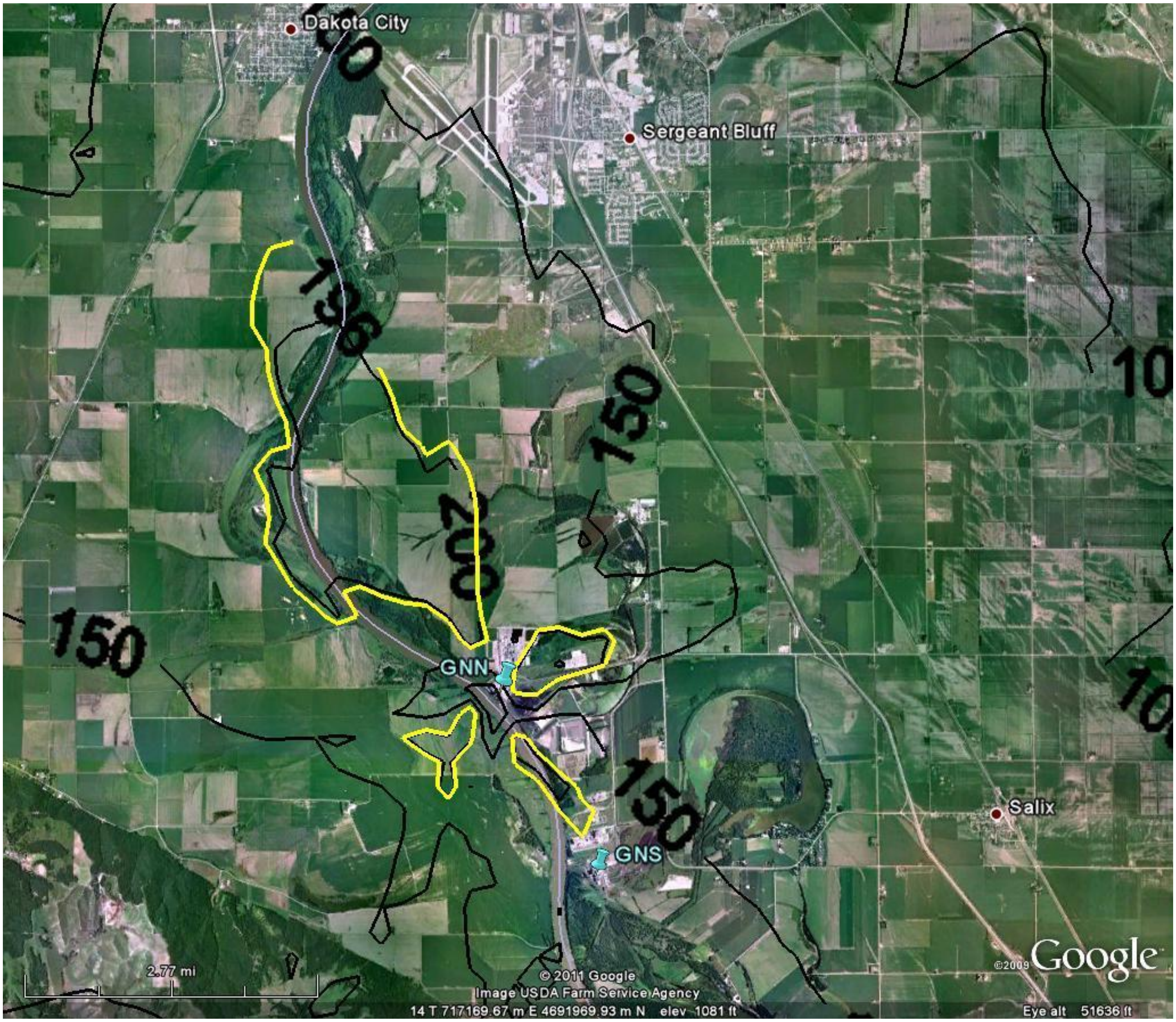


Figure 3. SO_2 Modeling of the MidAmerican George Neal facilities showing the impact of **ALL sources** (Units 1, 2, 3, and 4). Areas with predicted one-hour NAAQS violations are surrounded by yellow curves. Concentrations are expressed in $\mu g/m^3$; the NAAQS standard is 196 $\mu g/m^3$.

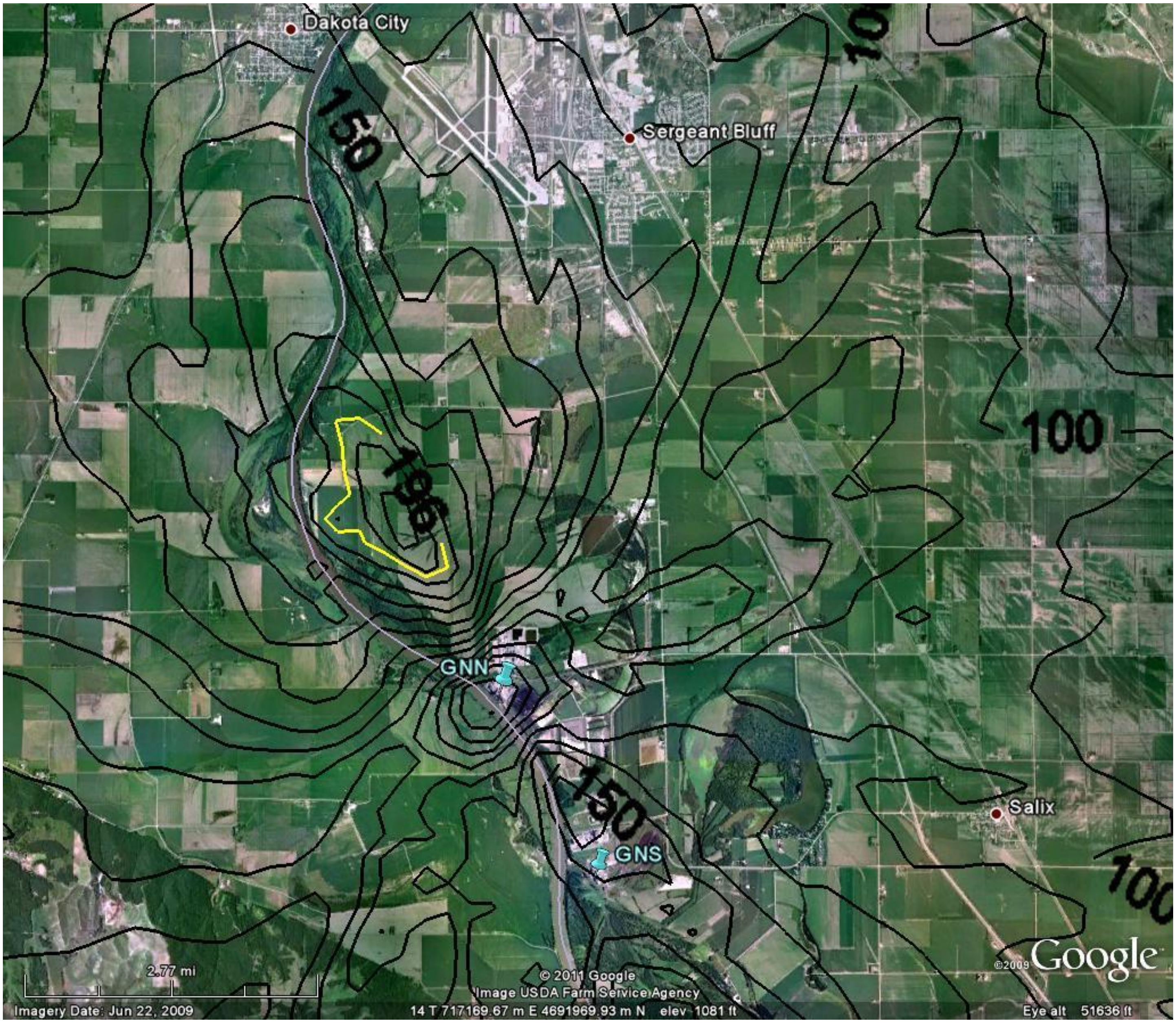


Figure 4. SO_2 Modeling of the MidAmerican George Neal facility showing the impact of **only Units 2, 3 and 4**. Areas with predicted one-hour NAAQS violations are surrounded by yellow curves. Concentrations are expressed in $\mu g/m^3$; the NAAQS standard is 196 $\mu g/m^3$.

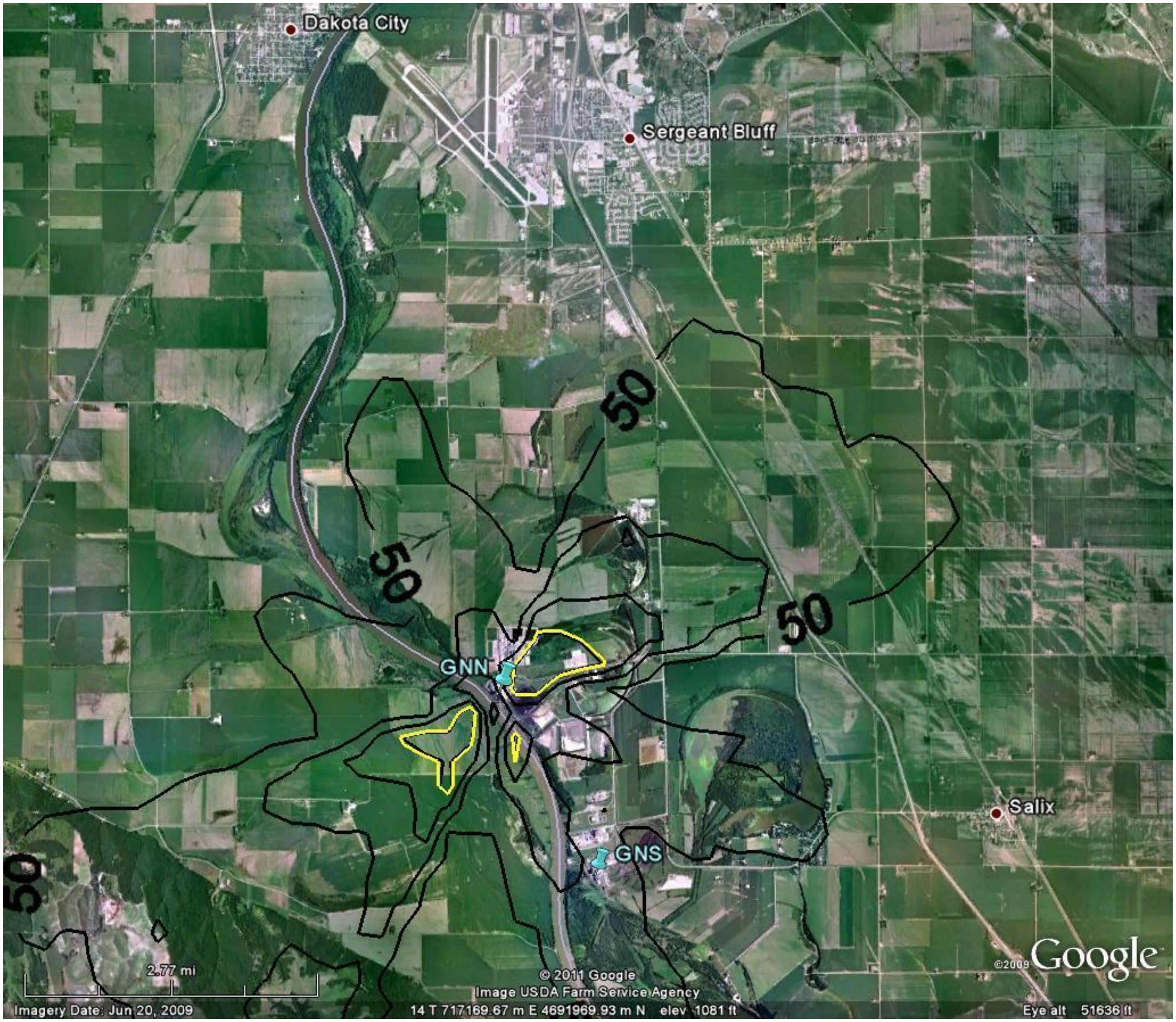


Figure 5. SO_2 Modeling of MidAmerican George Neal facility showing the impact of **only Unit 1**. Areas with predicted one-hour NAAQS violations are surrounded by yellow curves. Concentrations are expressed in $\mu g/m^3$; the NAAQS standard is 196 $\mu g/m^3$.

Flue gas desulfurization (FGD) is a pollution control technique that involves injection of a limestone slurry into the stack gas from a coal-fired boiler. FGD can reduce boiler SO_2 emissions by 90%, and is also effective in reducing emissions of other acid gases. EPA intends to regulate acid gas and mercury emissions with new "Utility MACT" regulations[12], scheduled to be finalized by November 16, 2011. EPA's current proposal allows three years for compliance with a possible one year extension. The proposal allows facilities to adopt an SO_2 emissions limit of 0.2 lb/MBtu and use currently existing SO_2 CEMs to exhibit compliance with the acid gas limits contained in the MACT.

[12] EPA's proposal for the Utility boiler MACT is available online at: http://www.gpo.gov/fdsys/pkg/FR-2011-05-03/pdf/2011-7237.pdf

Last year the IDNR issued a construction permit to MidAmerican to install FGD at GNS Unit 4. The IDNR has received a construction permit application from MidAmerican to install FGD on GNN Unit 3, and representatives of MidAmerican have indicated that they intend to submit an application to install FGD at Unit 2 in November of 2011. Construction permit applicants must begin construction within 19 months of issuance of the permit and complete construction within 42 months of permit issuance.[13]

SO_2 emissions from Neal Station are expected to decline sharply as FGD is implemented on Units 2, 3, and 4. Based on the current dispersion modeling, SO_2 emissions from Unit 1 are likely to generate SO_2 levels exceeding the NAAQS at hotspots close to GNN until a strategy to reduce SO_2 emissions is developed and implemented by MidAmerican.

[13] The permits for MidAmerican George Neal Station's Units are available online at:
https://aqbweb.iowadnr.gov/data/97/9704010/05A878P.pdf
https://aqbweb.iowadnr.gov/data/97/9704010/07-A-951-P.pdf
https://aqbweb.iowadnr.gov/data/97/9704010/95-A-313-S2.pdf
https://aqbweb.iowadnr.gov/data/97/9704011/05-A-655-P1.pdf

Appendix U: Sioux City (MidAmerican George Neal Station) SO_2 Modeling

IOWA DEPARTMENT OF NATURAL RESOURCES

Environmental Services Division
Air Quality Bureau
Modeling Group

M E M O R A N D U M

DATE: 05/17/11

TO: SEAN FITZSIMMONS
FROM: LORI HANSON
RE: EVALUATION OF POSSIBLE SO_2 MONITOR LOCATIONS IN VICINITY OF SIOUX CITY
CC:

ANALYSIS SUMMARY

Per request, a dispersion modeling analysis was conducted to evaluate possible SO_2 monitoring locations in the vicinity of Sioux City, Iowa. This modeling analysis evaluated SO_2 boiler emissions from MidAmerican Energy Company's George Neal North and George Neal South facilities for the new 1-hour SO_2 standard.

According to the results from the AMS/EPA Regulatory Model (AERMOD, dated 11103), the SO_2 emissions from the George Neal facilities will cause predicted concentrations that are greater than the applicable 1-hour SO_2 NAAQS.

An isopleth diagram indicating predicted 1-hour SO_2 concentrations, including background, is shown in Figure 1. The background value used for this evaluation is 7.86 $\mu g/m^3$ (3 ppb) and is based on the 1-hour design values calculated from Des Moines 2008 – 2010 monitoring data. The yellow isopleth represents 196 mg/m^3 (75 ppb), the new 1-hour NAAQS.

The boilers at the George Neal facilities were evaluated using the parameters listed in Table 1. The boilers were modeled using 2009 actual emission rates based on CEMs data as reported to the DNR by MidAmerican Energy Company.

Stack parameters are based on construction permits with the exception of the George Neal North boiler #3 and George Neal South boiler #4 temperature and flow rates. The temperature and flow rates for these boilers are based on current construction permit applications that have been submitted to the DNR (projects 11-155 and 10-658 respectively).

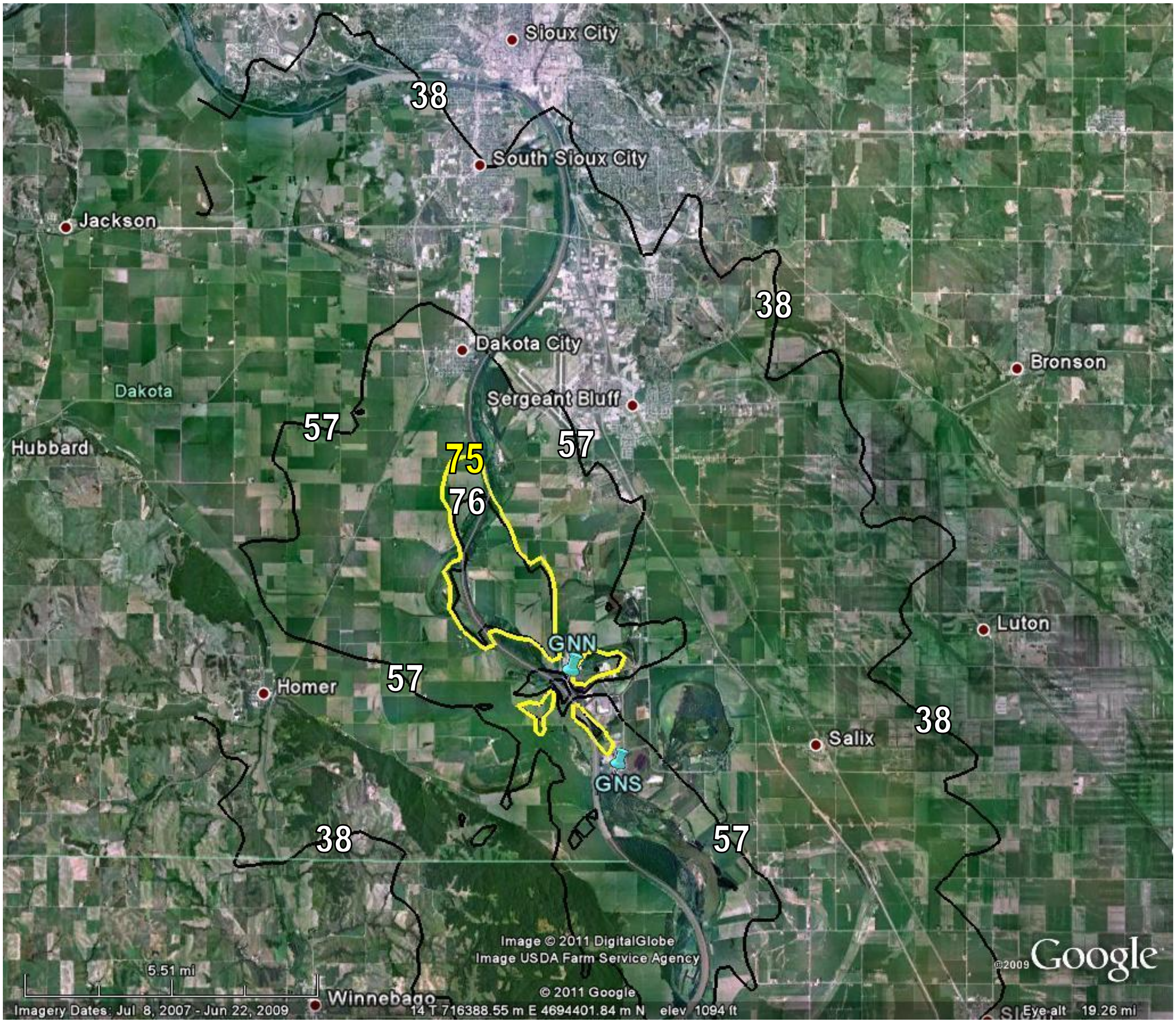
The worst-case 1-hour SO_2 modeling results are listed in Table 2. The boilers were modeled as operating 24 hours/day, 8760 hours/year.

Figure 1.

MidAmerican Energy George Neal Facilities

Dispersion Modeling Analysis of 2009 Actual Emissions

1-hour SO2, H4H with background of 3 ppb



Contour interval = 19 ppb
Yellow Contour = 75 ppb

Table 1. Modeled SO_2 Emission Rates and Stack Parameters – Point Sources

Emission Point	SO_2 (lb/hr)	Stack Height (ft)	Stack Gas Exit Temperature (°F)	Stack Tip Diameter (in)	Stack Gas Flow Rate (acfm)
GNN1	707.8	225	320	113	539,080
GNN2	1469.9	300	290	183	1,140,000
GNN3	2798.5	400	180	240	1,749,800
GNS4	2790.1	469	180	300	2,618,600

Table 2. Worst Case 1-hour SO_2 Modeling Results

Pollutant	Averaging Period	Predicted Concentration* ($\mu g/m^3$)	Background Concentration** ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
SO_2	1-hour	284.2 (109 ppb)	7.86 (3 ppb)	292.1 (112 ppb)	196 (75 ppb)

* The 1-hour concentrations are the highest-fourth-highest predicted values from all five years of meteorological data.

** The preliminary 1-hour SO_2 background concentration of 7.86 $\mu g/m^3$ (3 ppb) is based on Des Moines monitoring data from 2008-2010.